Journal of the Society of Arts.

FRIDAY, APRIL 30, 1869.

Announcements by the Council.

ORDINARY MEETINGS.

Wednesday Evenings at eight o'clock :—

MAY 5. "On the Formation of Industrial Settlements in our Colonies." By Col. FRANCIS C. MAUDE, C.B.

MAY 12.—"On the Ventilation of Drains." By JAMES LOVEGROVE, Esq., Assoc. Inst. C.E. On this evening Earl Ducie will preside.

MAY 19.—"On the Progress of the Colonies." By JOHN ROBINSON, Esq., of Natal.

MAY 26.—"On Silk Supply." By THOMAS DICKINS, Esq., President of the Silk Supply Association.

CANTOR LECTURES.

The concluding lecture "On Applied Mechanics," by JOHN ANDERSON, Esq., C.E., Superintendent of Machinery to the War Department, will be delivered as follows :—

LECTURE IV.—MONDAY, MAY 3RD.

Applied Mechanics in relation to Natural Power.

The lecture will begin at eight o'clock. These Lectures are open to Members, each of whom has the privilege of introducing two friends to each lecture. Tickets for this purpose have been forwarded to each Member.

COMMITTEE ON INDIA.

Conferences are now in course of being held for the discussion of various subjects connected with India.

The following arrangements have been made for the remaining three conferences :—

THIS EVENING (FRIDAY), APRIL 30.—"Indian Fibres." By LEONARD WRAY, Esq. The Chair will be taken by George Campbell, Esq.

FRIDAY EVENING, MAY 14.—"Waste Lands." By GEORGE CAMPBELL, Esq.

FRIDAY EVENING, MAY 28.—"Trade with Central Asia, Thibet, and South-Western China."

At these Meetings the chair will be taken at 8 o'clock, and the discussion will be opened by a paper.

Members of the Society interested in Indian questions are invited to attend.

PISCICULTURAL COMMITTEE.

On Friday Evening, May 7th, a paper "On Oyster Culture and Legislation" by ARTHUR F. PENNELL, Esq., will be read and discussed. The Chair will be taken at eight o'clock.

Members of the Society interested in this subject are invited to attend.

FINAL EXAMINATIONS, 1869.—NOTICE TO CANDIDATES.

The Court of the Worshipful Company of Coachmakers have resolved to place one silver and one bronze medal of the Company at the disposal of the Council of the Society of Arts, to be presented to the candidates (actually engaged in the trade of coach-building) who shall pass the best examination in "Free-hand Drawing" and "Practical Mechanics."

These medals will not be awarded unless, in the opinion of the Council, the candidates possess sufficient merit.

DESIGNS FOR CHANNEL STEAMERS.

The Council of the Society of Arts offer the Gold Medal of the Society, and the large Silver Medal of the Society, for the best and the second-best block model of a steamer, which shall afford the most convenient shelter and accommodation to passengers on the deck of the vessels crossing the Channel between France and England. The steamer is not to exceed in tonnage and draught the best vessels now in use between Folkestone and Boulogne, and the model must be on a scale of a quarter of an inch to a foot. The models, marked in cypher, are to be sent in to the Society of Arts' House, John-street, Adelphi, on or before the 1st November next, with a sealed envelope, giving the name and address of the designer.

ALBERT MEDAL.

The Council will proceed to consider the award of the Albert Medal early in May next. This medal was instituted to reward "distinguished merit in promoting Arts, Manufactures, or Commerce," and has been awarded as follows :—

In 1864, to Sir Rowland Hill, K.C.B., "for his great services to Arts, Manufactures, and Commerce in the creation of the penny postage, and for his other reforms in the postal system of this country, the benefits of which have, however, not been confined to this country, but have extended over the civilised world."

In 1865, to his Imperial Majesty the Emperor of the French, "for distinguished merit in promoting, in many ways, by his personal exertions, the international progress of Arts, Manufactures, and Commerce, the proofs of which are afforded by his judicious patronage of Art, his enlightened commercial policy, and especially by the abolition of passports in favour of British subjects."

In 1866, to Professor Faraday, D.C.L., F.R.S., for "discoveries in electricity, magnetism, and chemistry, which, in their relation to the industries of the world, have so largely promoted Arts, Manufactures, and Commerce."

In 1867, to Mr. W. Fothergill Cooke and Professor Charles Wheatstone, F.R.S., in recog-

nition of their joint labours in establishing the first electric telegraph.

In 1868, to Mr. Joseph Whitworth, F.R.S., LL.D., "for the invention and manufacture of instruments of measurement and uniform standards, by which the production of machinery has been brought to a degree of perfection hitherto unapproached, to the great advancement of Arts, Manufactures, and Commerce."

The Council invite Members of the Society to forward to the Secretary, before the 2nd May, the names of such men of high distinction as they may think worthy of this honour.

Thames Embankment Committee.

The proceedings of this Committee, so far as they relate to the question of the site for the Law Courts, have been reprinted in the form of a pamphlet, which may be had of the Society's publishers, Messrs. Bell and Daldy, York-street, Covent-garden, price threepence.

Subscriptions.

The Lady-day subscriptions are due, and should be forwarded by cheque or Post-office order, crossed "Coutts and Co.," and made payable to Mr. Samuel Thomas Davenport, Financial Officer.

Proceedings of the Society.

Thames Embankment Committee.

The sixth meeting of the Committee took place on Tuesday, the 20th inst., at 12 o'clock. Present:—Earl Grosvenor, M.P., in the chair; Lord Henry G. Lennox, M.P., Sir Charles Trevelyan, K.C.B., Colonel Scott, R.E., Colonel Ewart, R.E.; Captain Ducane, R.E.; Messrs. H. Cole, C.B., Baillie Cochrane, Seymour Teulon, and C. F. Hayward.

Mr. Charles F. Hayward, F.S.A., described to the Committee, with the aid of plans and elevations, ordnance maps, and other data, his design for the arrangement of the Embankment between Hungerford and Waterloo-bridges. He brought this matter forward with especial reference to the hoped-for abolition of the "Viaduct" (as it had been called, though it was chiefly an inclined street from the foot of Hungerford-bridge to Lancaster-place, on the level of Waterloo-bridge), as to which Lord Elcho's Committee was sitting at the House of Commons, because, in the event of that viaduct being done away with, the necessity would arise of reconsidering the whole arrangement of that part of the Embankment, and upon the result of such deliberations would very much depend the public benefit to be derived from this great work. Putting aside for one moment the question of the Law Courts, there could be no doubt that, both with regard to the extent of land reclaimed from the river, and to the character of existing buildings and approaches as likely to influence the ultimate result, this was the most important part of the Embankment. The first plan and designs were made in 1861, at the time the Bill was being discussed, and these were exhibited in the 1862 Exhibition. Of course the existence of the proposed viaduct was taken for granted, but very little reflection would show anyone—while a slight examination of the plan would convince anyone sceptical of the fact—how fatal would be this inclined street to the proper utilisation of the ground reclaimed from the river. But what he (Mr. Hayward) was able to show by a fresh plan was, that even if the viaduct was decided against, the space would still be completely spoiled without proper management. The construction of the viaduct would leave only small or shallow plots of ground next the river; but, that being abandoned, it was shown by the plan that a large piece of ground could be secured, not only without any sacrifice of accommodation, but with great convenience to the traffic in the neighbourhood. In arranging the streets and communications of this peculiar locality, the great point to settle was, how satisfactorily to get over the difference of level between the Strand and the Embankment, so that access should be afforded both to foot-passengers and conveyances at a moderate gradient, and at the same time to secure, if possible, the large space of ground, on which a public building, if desired, might be erected, the ground being what had been gained by reclaiming from the river the deep bend between Waterloo-bridge and Whitehall. One feature in the case, which had hitherto proved a stumbling block, was the steep bank or cliff of the Savoy, forming quite a precipice on the western side, where the walls of the old Savoy Palace, once the residence of John of Gaunt, still exist. As at first laid out, he believed the street was to pass through the burial-ground attached to the Savoy Chapel, but it was afterwards agreed to be diverted, and this "viaduct" was designed (although only a small portion of the roadway was to be carried on arches), in order to avoid opposition. The object to be attained was to bring the high level of Waterloo-bridge and Somerset-house, at Lancaster-place, into direct connection with the low-level of the Embankment near the Savoy, yet not to disturb the chapel or churchyard, and at the same time to obtain communications with the Adelphi on the high level with the bottom of the Adelphi on the low level, and with the various streets leading from the Strand. In order to accomplish this, he (Mr. Hayward) proposed to form the present open space westward of the walls of the Savoy (measuring about 300 feet across), and immediately below Beaufort-buildings, into a "piazza" or "place," to be called the "Savoy-square" or "Savoy-garden," open to the river, which would be just in that angle of the curve where it would command views of Westminster on the one side and of St. Paul's on the other. Between this and Lancaster-place he would erect a building to correspond with Somerset-house, the present western façade being repeated, and that beautiful feature of the river frontage, the open colonnade on an open archway, being also repeated, Wellington-street passing between them in a kind of square, and the terrace being continued westward, and returning around the eastern side of the proposed new square or garden. By these means neither the Savoy nor German burial-grounds would be disturbed; the old wall of the Savoy-palace, with the chapel itself, would remain, and, by a continuation of the buildings to the Strand, the architecture of Somerset-house would flank the Waterloo-bridge roadway from the Strand to the water. Then, instead of bringing a street or viaduct all the way from Hungerford to Waterloo-bridge, he proposed that the roadways enclosing Savoy-garden on the east and west sides should slope upwards in the same way as Trafalgar-square, and that from the north-east and north-west corners of a mid-level terrace streets should ascend—forking eastwards and westwards, and enclosing the block of Beaufort-buildings — to the Strand, the gradients being about 1 in 26 to 1 in 28. The square itself would be on the slope (with fountain and grass-plats, or paved), while, from the mid-level, a street running westward would give a communication with Adelphi-terrace, taking up on its way Salisbury and

Cecil-streets. A parallel but descending footpath, or roadway if desired, would throw open those grand, though at present dirty and disreputable, arches upon which Adelphi-terrace stands, and which would be useful for shops or ware-rooms. These streets would afford all requisite accommodation for the traffic, and, at the same time, leave an open space towards the river, 780 feet long, by 300 feet wide at one end, and 200 feet at the other. At the western end of this, however, the railway made a curve in and out again in a way which, if it were impossible to alter that arrangement, might necessitate the sacrifice of a portion of the ground as far as the continuation of George-street, widened as he proposed. Of course, everybody who had a door or window all along this line would have a right of opposition (if rights were all reserved, as had been stated), but he apprehended the objections to this plan, as compared with the viaduct, would be infinitesimal; and the buildings on the large plot of land he had mentioned, might be arranged with open gardens at the back, so as to be an ornament rather than an inconvenience to the houses in the Adelphi.

Mr. Seymour Teulon remarked that an Act had been obtained, the powers of which he did not think had expired, for taking a number of buildings near the Charing-cross Station, by a company formed to make a railway connecting the Charing-cross and Euston-square stations.

Mr. Hayward said it would be rather an advantage to his design than otherwise if this scheme were carried out, as it would settle the doubt on the plot west of George-street he had referred to, and leave a frontage of 500 feet still for the new building. He suggested that there should be through communication from the Embankment by George-street, Adelphi (which would be widened) leading to King William-street, to take the Regent-street traffic, which came mainly through Leicester-square. There ought also of course to be a direct communication with Charing-cross, as he had shown it might be without touching Northumberland-house, but this would be on the other side of the railway bridge, with regard to which he was not so particularly anxious just now, as the communication would be partially provided by the intended continuation of Whitehall-place, and the rest must come in due time. He felt very strongly, however, that some plan should be decided upon, whereby, when the viaduct had been abolished, as he did not doubt it would be by the decision of Lord Elcho's Committee, they should endeavour to provide that something else be done which would not be equally fatal to the proper utilisation of the Embankment. Mr. Hayward then laid before the Committee some designs for the purpose of adjusting the levels of the various streets from the Strand within the buildings on the Embankment, the principal feature being a double row of shops or offices, one above the other, a light footway running along the whole length of the buildings, and so arranged as to communicate on a level with the various intersecting streets. This, however, Mr. Hayward stated, was a mere matter of detail, and quite independent of the plan which he had described for laying out the communications in the neighbourhood of the Savoy and the Adelphi, which he considered of the utmost importance eight years ago, when the Embankment was not begun, but much more so now it was an accomplished fact.

Sir Charles Trevelyan said there appeared to be many excellent points in the plan which Mr. Hayward had laid before them.

In the first place it preserved the individuality of the Old Savoy Palace, and it was a great thing, when they were able, *stare super antiquas vias*. This ancient palace was indissolubly connected with many cherished historical and popular associations, having been built by Peter of Savoy, uncle of Eleanor of Provence, queen of Henry III., and having been the residence of the captive King John of France; and to this he returned and died, when he was unable to fulfil the engagements he had entered into for the payment of his ransom. After that, the famous John of Gaunt, Duke of Lancaster, lived here; and when the Reformer Wickliffe was cited by the Bishop of London to appear before him in St. Paul's Cathedral, John of Gaunt attended him there, and used expressions towards the Bishop which were resented by the Londoners, who advanced against the Savoy in a tumultuous manner; and the palace was soon after sacked and burnt in Wat Tyler's insurrection. It was rebuilt by Henry VII. and Henry VIII., and, after having been the scene of other historical events, it became a place of refuge for the French and German refugees in the religious persecutions. A fragment of the palace remains to this day, and the ancient ducal and royal chapel has lately been fitted up in a very interesting manner, under the immediate directions of her Majesty.

Another admirable feature of Mr. Hayward's plan was, that it provided a satisfactory communication between the Embankment and the Strand, a short distance to the west of Somerset House. It was proposed that there should be another lateral communication, on the other side of Somerset House and the law courts, between them and the Temple, opposite the steam-boat pier at the bottom of Essex-street, which would lead direct to the three northern railways, across the Strand and Holborn, without any expense beyond the removal of a screen of inferior houses between Lincoln's-inn-fields and the wide thoroughfare of Bedford-row; and if there were this communication also on the western side of Somerset-house, he thought the public requirements would be satisfactorily provided for.

The plan also provided an ample site for any public building which it might be determined to place on the Embankment in the ancient bend of the river, and combined with this every end intended to be accomplished by the hideous projected viaduct. He thought that Mr. Hayward's bifurcated communication between the Embankment and the Strand, by way of "Savoy-square," taken in connection with the proposed transverse communication with the Adelphi and George-street widened, would answer every necessary purpose. But all would be incomplete and out of joint if the *direct* communication between Cockspur-street and the Embankment, originally recommended by the Metropolitan Board of Works, was not carried into effect.

The following additional particulars relating to Cleopatra's Needle have been kindly furnished by Field Marshal Sir John Burgoyne. They will be read with interest, in continuation of the proceedings of the Thames Embankment Committee, reported in the last number of the *Journal*:—

"With regard to the 'prostrate Alexandrian obelisk,' or Cleopatra's Needle, as it was called, I have a keen memory of it generally, but very vague in particulars. I did not serve in the first expedition to Egypt of 1801. I sailed from England with the force under Abercrombie but was detached from it at Minorca, for the blockade of Malta, at which place, after its capture, I was left, desperately ill of a fever, when the army passed it; but I visited Egypt on leave, in 1802, after our troops had left it, and heard all about the Needle.

"We considered it among the trophies or property we had gained from the French, for, with the disputed claims between the Mamelukes and the Sultan, there was then no recognised rightful proprietor.

"After the French were expelled, Major-General Lord Cavan was left in command, and took a great interest in the project for the removal to England of the prostrate obelisk (for there is one near it erect), and I think it was meant to do it by subscription, which failed; but the arrangement went so far that a transport was selected for its conveyance, and the manner for its stowage defined, which was a somewhat delicate operation with such an enormous single block,

and the size of the vessel; and even a temporary timber jetty, to the end of which the ship could lie, was constructed from the shore close to the monument, when the whole was interrupted for want of funds.

"Some officer drew a caricature of the said General carrying off the Needle, Pompey's Pillar, and I think some of the Pyramids, to which were attached some doggrel rhymes, of which by some perverse effort of memory I can call a part to mind, as here annexed:—

Attached to a Caricature.*

How you thus, Atlas-like, sustain
Such ponderous weights, nor yet complain
Of toils attendant on your station;
And how, in your gigantic eyes
Vast mountains shrink to molehill size,
I note my Lord, with admiration.

The needle on the Egyptian shore,
Beheld by you, appears no more
Than a small bodkin stuck through paper;
And Pompey's pillar, I declare,
I w sh your lordship had a pair,
'Twould serve you just to hold a taper.

Proceed, my lord, complete your work,
Leave not a pebble to the Turk,
A fickle, false, degraded creature.
. . . . .
And render our prize-money greater.

"Whatever right we may have had to abstract this monument in the first instance, it seems to have been formally granted to us by the Pasha, in 1820, and it is to be regretted that we should not avail ourselves of the opportunity of possessing so fine a specimen."

The following letter from Mr. John Macgregor brings the history of the Alexandrian obelisk to the present time:—

"In 1849, I saw the English obelisk at Alexandria, and then two-thirds of it might be inspected. In 1869, I went to see it, travelling with my canoe, and with more interest, because I saw in a local paper, in Cairo, that you had made an effort to get this splendid monument brought here—I mean to the Temple.

"I was positively shocked to find that the obelisk was entirely covered, and not one atom of it is now visible. It is in a stone-yard, and is completely covered up by good hard, honest-looking ground. The exact site of it is now not quite remembered, but the man there thinks he knows where it is. In a very few years we may have to dig shafts, like those I have been in at Jerusalem, to see where a gift-stone is, second to none in Egypt for interest, and to few in grandeur and dignity. Is not this perfectly monstrous? The sea breaks against a high wall a few yards from the assumed place of this magnificent stone, and it would be a matter of mere ordinary mechanical work to float it and carry it home. My father, who was in the expedition to Egypt, when Lake Mœrstis was formed, to resist Napoleon's attack, told me that the English officers at that time actually subscribed a sum enough to bring this stone to England. A vessel was procured, but a storm broke her to pieces. The government of that day cared little, and did less, to help this worthy effort; but now we are surely wiser.

"Look at the French in comparison. Why, they actually opened up the enormous sand-hills at Zoan, three years ago, and I went up the Murcha River in my canoe to see them. There they have seven or eight huge obelisks, and a dozen monolith statues, and pillars innumerable, all unearthed by French money, without even the chance of bringing one of them away. Yet here, we, the greatest, richest nation on earth, are allowing the earth to conceal, perhaps for ever, the ancient glory of the past, which, already ours, though far off, would be tenfold more speaking, suggestive, and interesting, if we brought it here.

"If I could help at all in bringing this Alexandrian stone to London, it would be a real pleasure, if even to remove a stigma on our nation, for we are often and justly blamed in Egypt, because we spend thousands in digging up things all over the globe, but will not spend hundreds to bring this one home, or spend tens to keep it from being lost for ever. Better, perhaps, for us that it should be buried and forgotten too, so as to be no longer a record of our insular inconsistency."

"Temple, April 24th, 1869."

* The caricature was a tolerable likeness of Lord Cavan. He had the Needle under one arm, and Pompey's Pillar, and one or two Pyramids, in a basket like that in which a carpenter carries his tools on his back.

India Committee.

The adjourned conference on Mr. Hyde Clarke's paper, "On Hill Settlements and Sanitaria," took place on Friday evening, 23rd April, Lord William Hay in the chair.

Colonel Haly, in re-opening the discussion, said—I am sorry to hear from those who ought to know the capabilities of Bengal, that it is limited both in means and space for colonisation and settlement. I believe this to be somewhat of a libel on the supreme Presidency which will be easily contraverted. I leave it, however, to others better acquainted than myself with actual localities in Bengal to do so; and proceed to the minor and more humble Presidency of Madras, where will be found space sufficient for a large influx of England's children, and with a fair opening for European labour and enterprise. The localities to which I allude are, the Neilgherry hills, the Shevaroys, the Pulneys (where I may mention that the present Governor, Lord Napier, is now erecting a summer residence), Cotallum, in Travancore, and the Jeypore mountain tracts in Orissa. These latter, it is true, have never yet been what may be called tested, though, from my experience of them, I believe that they will be found second to none, both in climate and soil, and with space on their plateaux for a good round number of English homesteads, and with a surrounding population perhaps more open to improvement and ready to receive the fruits of civilisation than most others throughout our dominions in India, simply from the fact that many of the surrounding tribes are in a state of greater ignorance, and untrammelled by those religious prejudices which have been found the greatest of all bars to the advance of Christianity in India. I am not now, however, going to advocate European colonisation on the score of proselytism, though I do believe that, until you bring the European element more in immediate contact with the natives, and make their interests more identical, the missionaries will continue to find their work, as heretofore, of a very uphill description, My advocacy is on the score of economy, which is more likely to gain the object in view. The economy that I allude to is the reduction of the European military force in India, which the European colonisation of that country would eventually, and that speedily, lead to, as the fact of there being at hand an able body of acclimatised Englishmen would carry its own influence, and obviate the necessity for keeping up so large and expensive a purely military force of Europeans as is now found requisite, and be the means, in fact, of "turning their swords into reaping-hooks," though still having at hand an ever-reliable material in case of emergency. Although the advisability of European colonisation first suggested itself to me, as I have already said, some twelve or fourteen years ago, yet it was not till after the mutiny had broken out that I ventured to bring it to the notice of the authorities, which I did in 1858, in the form of some suggestions submitted to Lord Stanley, the then Secretary of State for India, which, had they been acted on at that time, would have ensured by this

not only some thriving colonies of Europeans in that country, but the State would have been saved enormous amounts expended in the passage-money alone of invalids, to say nothing of the valuable lives that might have been saved, by having established more sanitaria and settlements for those to resort to whose constitutions are as incapable of withstanding the climate of the plains of India as that of England, after being broken down by having to encounter a tropical climate at the too early age at which many of our soldiers are sent out to it. This was more particularly the case during the mutiny, from the fatigues and hardships to which many succumbed who might have made good settlers, had there been European hill-colonies to which they could have been sent, instead of being returned, as is but too often the case, as paupers on their parishes at home in England. The plan I proposed for carrying out this desirable object was to endeavour to induce the time-expired soldier, as well as those "invalided home," to remain and settle on the hills in India, by the offer of grants of land, and thus save the expense of this transit back to this country. The amount for transit thus saved, together with pay that must of necessity be given to them ere they could receive their discharge, would have gone a long way to have settled them down as useful squatters, as well as good material for the formation of a reserve force. This plan is, of course, still open to be carried out, though not with the same immediate results, or on so extended a scale as it might have been when first proposed by me, when there was at hand so much larger and, after a time, unrequired military force to work on. Now, if added to this, on the questionable reduction of the officers of the Native Army, they had likewise been in the same manner induced to settle in India, instead of having been so cruelly and injudiciously forced, it may be said, out of it, the material for the organisation of a reserved military force would have been complete, and at the same time the agricultural interest of the empire would have been better studied, and a large portion saved of that present enormous outlay of ten millions sterling for barracks, in part at least obviated. With reference to the suitability of the climate of the mountain ranges of India to the European constitution, I cannot do better than refer to the papers read by Dr. Mowatt, at the United Service Institution, in 1866; where will be found an opinion by this well-acknowledged authority, which I would recommend to the serious attention of those who would still wish to see our soldiers stewed and grilled in the plains. Great necessity exists for care being observed in the selection of good and dry positions for sites for several of the hill-stations, and that they be drained previous to becoming settled. Look at the several stations on the Neilgherry Hills, only one out of the four, viz., Kotagherry, has been judiciously selected; the original sites of the other three are mere basins, so surrounded with hills as to prevent the possibility of a free and healthy circulation of air, with drainage almost unthought of, though peat bogs, swamps, &c., exist in their very midst. This is the more extraordinary, as, close at hand, viz., Wynaad, formerly one of the most deadly places, perhaps, throughout India, has been converted by cultivation and drainage into a salubrious tract, now inhabited by European planters and their families. Most of these ranges are much under the supposed safe altitude, which shows that if the necessary sanitary precautions are taken, even the lower ranges or plateaux of India, with well-selected elevated dry sites, may prove to be genial and healthy localities.

Dr. Archibald Campbell said:—Having served a long time at hill-stations, I am glad to give some of the results of my experience to this meeting. My first connection with the hills was in 1829, when I accompanied the first detachment of European convalescent soldiers from Meerut to Landour. It was in April, and very hot on the plains. I shall never forget the delightful impression made upon me by the first ascent of the Himalaya; a cool and invigorating breeze put new life into every-one. The hill-sides, above 5,000 feet, were gorgeous with the scarlet tree-rhododendron in full flower, and the snowy range stood out bright and clear against a blue and cloudless sky. The rapidity with which the change of climate to an elevation of 7,000 feet effected a recovery in all the men recently suffering from acute attacks of fever and liver disease—notwithstanding the bad accommodation in barracks and hospital, hastily run up and not finished, the bad bread, and indifferent rations—was very remarkable. I again visited Landour and Mussoree, in 1831, and travelled across the mountains to Simla, and onwards to the Sutlej, whence I went to Nepaul, where I was for eight years. From Nepaul I went to Darjeeling, where I remained 22 years, in the course of which I travelled all over Sikhim and into Thibet. I have, therefore, seen a good portion of the Himalaya, in the north-west, in the central region, and in the south-east, and had experience of its climates at all elevations, up to 19,000 feet. I quite agree with all that Mr. Hyde Clarke has said in their favour, and as to the large field for occupancy, although we are quite shut out from Nepaul and Cashmere. The great features of all the stations are much alike; the following distinguish Darjeeling:—The hill portion is about 460 square miles. The elevation varies from 1,200 to 10,000 feet above the level of the sea. All elevations above 3,000 feet are healthy for Europeans. Indian corn grows up to 5,000 feet, potatoes to 7,500. Tea thrives best at elevations up to 4,500 feet. It does not grow at elevations above 7,000. English vegetables do very well up to 7,500; they have not been tried at higher points. The scenery is unsurpassed in grandeur; the climate excellent. It is cooler in summer, and warmer in winter, than the western stations at similar elevations. The rain-fall is 120 inches per annum. The spring is showery; the rains commence about a month earlier and continue a month later than at Landour and Simla. There is still much land available for settlers, and it is a fine field for them. Access is still difficult; of this I shall speak presently. Labour is abundant and cheap. Mr. Hyde Clarke has said, and it is a very general subject of remark, that although the British Government has possessed India for so long a time, and although the climate of the country is, upon the whole, inimical to the European constitution, so little has been done to utilise the hills, the climates of which are so salubrious. There is no part of India proper in which we can avoid six months of hot weather, with a great proneness to tropical diseases, nor can we ever colonise it. Throughout the Himalaya we can have every variety of temperature, and cold healthy climates, according to the elevation we may select. No doubt the remark is, to a great extent, well-founded; but, on the other hand, it must be recollected that there was everything to learn of these hills at starting, and that it was not until 1815, when the war with Nepaul was brought to a successful termination, that we had any footing at all in the hills. Our first stations were Almorah and Subathoo, for civil government and military occupation. Then followed Simla, in 1825, as a general sanitarium; Landour as a sanitary depôt for European soldiers; with Mussooree, adjoining, in 1829; Darjeeling, to the *east of Nepaul*, ceded by the Rajah of Sikhim in 1835, was opened in 1839; and then followed the military cantonments of Kussowlie, Juttogh, and Dugshai, near Simla. Since the Punjab war, of 1848, the hill-stations of Murree, Dalhousie, Dhurmsala, Chumba, Kangra, and Bukloh have been formed as sanitaria and governing stations, to which has been added Cashmere for officers during the hot season only. There is also Nynee Tal, a general sanitarium in the province of Kumâon, with Ranakhet and Chukrata; so that we have many stations on the whole, although the total number of European soldiers on the hills, for this hot season, sick and well included, will not exceed 6,000, or about eight per cent.

of the whole army, taking it at 72,000 men. Mr. Clarke has very truly said that the range of subjects connected with the hill-stations is so great that they can only be glanced at in a meeting of this kind. This is all I shall attempt to do, and it will be under six heads:—1. As sanitaria for Europeans of all classes requiring change from the plains. 2. As sanitary depots for European soldiers. 3. As cantonments for the European troops. 4. As places of settlement for Europeans. 5. As places for colonists and military colonies. 6. The means of communication, internal and with the plains. 1. As general sanitaria for Europeans who require a change of climate after acute attacks of disease in the plains, or who are suffering from weakness caused by hard official work, or long residence in India, and for ladies and children who are not ill, but for whom it is very desirable to be removed from the heat and disease of the plains during the hot and rainy season, they have been of the greatest benefit. The advantages in these respects have hitherto been principally derived by the officers of government, civil and military, lawyers, merchants, and high railway officials, their wives and families. The cost of travelling and high house-rents have hitherto deprived the middle class of Europeans of all the sanitary advantages of the hill-stations. To Europeans who are near enough a hill-station to be able to afford to keep their families there for six months of every year, the advantages are immense, and the value of Indian service is thereby greatly enhanced. Their children are quite as well off for climate as if they were in England, and can be kept with their parents for four or five years longer than those of other officers stationed at a distance. 2. As convalescent depôts for European soldiers whose regiments are stationed in the plains. This was the earliest use we made of the hills. The first depôt was formed at Landour, in the N.W. Himalaya, in 1829, for 100 men, to be supplied from the regiments at Meerut and other stations at and above Cawnpore. It was followed by Cheerapoonjee, in the Khassia Hills, which was a failure; then by Darjeeling, in 1842, for the regiments at Calcutta; Dinapoor, and upwards to Allahabad; by Murree, in the Punjab, Himalaya, for the Punjab regiments; by Dalhousie and Kangra, in the same division of the hills. It may be quite safely asserted that all the depôts have successfully answered their purpose. They are all at elevations of about 7,000 feet—1,000 or 1,500 feet lower would be better perhaps. Many soldiers are every year restored to health, and long continued in the service by these means. Very much, however, depends upon the proper selection of cases to be sent to the depôts by the regimental surgeons, and the station committees. As a general rule, I believe it may be admitted that men who have had acute attacks of fever, liver disease, rheumatism, and dysentery, will be certainly restored to health by a hot and rainy season in the hills; while cases of chronic dysentery and rheumatism, with or without syphilitic taint, will not be benefited. It is within my own knowledge that, for three successive seasons, the cases sent to Darjeeling were so badly selected, that the result at length attracted the serious attention of government in Calcutta and in England, when more care in the selection altogether altered the results, and established a confidence in the sanitary effects of the climate of that station which has never since been shaken. The convalescents go to the hill depôts in March and April, and return to their regiments in November and December. They are carried in doolies—*i.e.*, litters on men's shoulders—or in country carts, to the hills, and marched back on foot. The exposure and tediousness of both modes are sometimes very injurious; but in this, as in all other matters affecting the value of the sanitaria, the want of railways to the foot of the hills is greatly felt. 3. As cantonments for the permanent quartering of European troops, the value of the hills has not been so generally assented to. There is some diversity of opinion on this subject; to this, as well as to other serious military and political considerations, is, in some degree, to be attributed the slowness of progress in this important direction. The want of railways, however, by which alone the locking-up of troops in the hills can be obviated, is another great cause of delay, which ought to be removed. The regimental cantonments are at Darjeeling, which has proved to be as healthy as any station of the British army, home or foreign, and at Kussowlie, Juttogh, Dugshaie, and Subathoo, all in the North-west Himalaya, and convenient to the Punjab. Except Subathoo, they are all about 7,000 feet above the sea. The prevalence of diarrhœa at some of the north-west hill-stations has been unfavourably reported on by the medical officers. There are no objections to Darjeeling on this score, but the want of railway communication presses upon it more heavily than on any of the north-west stations, as it would be more difficult, from the nature of the country, to bring a regiment from Darjeeling to a railway line during the rains than from other hill stations. 4. As places of settlement for European officers of government and others who have resided long in India, the hills are, by general consent, highly approved of, and, no doubt, the opinion is well founded; still, the number of persons of this class who have adopted them as places to live and die in, and to settle their families in, is not very large. The great advantages are, the healthy climate, the retention of Indian servants, and Indian modes of life and society, which are very genial to the old Indian, as compared with the new career he has to enter on if he returns to England. The disadvantages are, the want of educational establishments, the reluctance to give up all hope of joining in the civilisation of Europe, and the craving for a return "home," which never seems to be quite obliterated in any British heart. 5. As places for colonists, and suited to the planting of military colonies. On the first of these propositions there has not been much interest taken by the Indian Government, but a good deal has been written on the subject by well-qualified persons. The finest published essay on the subject was by Mr. Hyde Clarke, the author of the able paper we have listened to; it is entitled "Indian Colonisation, Defence, and Railways." It is exhaustive of all that that was then known of the advantages of the hills for European colonists. The next was a very elaborate paper by Mr. Hodgson, formerly Resident in Nepaul, which was published in 1858 by the Government of Bengal. More recently, Dr. Graham has published a treatise on the same subject, and Dr. Hooker in his Himalayan journals, has touched on the same question. These authorities, and they are eminent ones, are unanimous as to the suitability of the climate for European colonists, and on this point I agree with them, but there is one drawback to the scheme which I cannot overlook, and it is justified, I think, by the experience of colonisation in America and Australia. In those two great countries, the colonist was necessitated to work with his own hands, from the beginning and to the end, without the help of servile native races. In the Himalaya there is an abundant native population, ready and willing to serve the white man at very low wages. Wherever this exists, the European will have recourse to it, and, in doing so, he will at once, I consider, depart from the essential conditions of a real colonist. Having said this much to qualify the strong opinions of others in favour of colonisation pure and simple, I must ask your indulgence for a few minutes, to record the strongest instances in my experience in favour of settling Europeans in the hills, with the advantages of native help. In 1840, Mr. Start, an English missionary, brought four Germans from the neighbourhood of Berlin to Darjeeling. Three of them were married men, and of the labouring class; the fourth was an educated man, who devoted himself to mission work only, and who married an English woman. All had families. The three married men at once procured land, built houses for themselves, cultivated the land to supply Darjeeling with potatoes and vegetables, reared poultry

and pigs for the same market, and even advanced to keeping dairies and supplying the station with milk, butter, beef, and mutton; to this was added a shop or store, by one of them, for groceries, hardware, tools, glass, crockery-ware, &c. Another took up house and land agency; and the third went into tea-cultivation with eminent success, leaving off, two or three years ago, with a fortune little short of £20,000. All were successful; all were very industrious, sober, and hard working men; their families grew up, under my own eye, to be vigorous and healthy men and women, and their grandchildren, still at Darjeeling, are as strong and healthy as any persons in Europe. These men had their passages and outfit provided by the missionary, who also advanced them a small capital at starting, not more, I believe, than £50 each; all the rest was the result of hard work, frugal habits, and good moral character, with the advantage, however, of cheap native labour. Nothing can be more encouraging than the career of these men, and there is plenty of room for such at all the hill stations, but still they were not out-and-out colonists, depending on the work of their own hands alone, as the emigrant to Canada, America, Australia, and New Zealand must do, and under which he thrives and peoples these countries. On the second scheme, or military colonisation of the hills, I have only to say it is still untried; and, although I gave the subject a good deal of consideration at Darjeeling, I was not able to propose any plan to government, with the practical character of which I was quite satisfied. Mr. George Campbell and General Eyre have each given us their views on this subject. Another practical suggestion I have seen is made by Dr. Mouatt, Inspector of Jails in Bengal, who has frequently resided at Darjeeling. He made it in a paper on this subject, read before the Royal United Service Institution, three years ago, on the subject of military colonisation of the Himalayas. Dr. Mouatt says:—"My plan would be this. I would, in the first instance, select most carefully 300 well-conducted, healthy soldiers, whose term of service had nearly expired, and I would take equal care that my intended colonists had healthy, well-conducted wives, with young families. These 300 families I would form into one village community, with grants of land of sufficient extent to admit of their supporting the village when fully cultivated. To each village I would appoint a captain and subaltern, married men with growing families, to control and direct it in all matters in which guidance was required. The officers should also have grants of land, and become *bonâ-fide* settlers, and they should be armed with all the powers necessary for the entire management of their charges. Medical attendance and education, with which religious offices and instruction should be combined, I would likewise provide, every member of the community having his grant of land, and being thoroughly identified with it. In addition to attaching some light condition of military service to each soldier-settler, from each family I would exact the condition suggested by Sir Henry Lawrence, of supplying a recruit for service for ten years to the European force in India. By some such plan as this, carefully worked for five years, the practicability of military colonisation would be fully tested, at a cost that could be more easily borne by the revenues of India than the large outlay now incurred in in sending time-expired soldiers to Europe, and removing regiments without any real necessity, as frequently as seems to be contemplated, on pleas of health and necessity, which are utterly untenable." 6. The internal communications are bad everywhere. In conclusion, I will, therefore, submit only one very important matter to your consideration, in the hope that, through so many well-informed persons, who are, no doubt, well wishers of their countrymen and women in Bengal, it may make some impression beyond these walls. Although Darjeeling is the only sanitarium for Bengal, and that province and Calcutta have by far the largest European and Eurasian population in all India, invalids are deprived of the blessing of healthful change of air because there is no railway. Hundreds of our countrymen, who are too poor to take a voyage to England, are really languishing and dying in Calcutta and other parts of Bengal, while a few hours of slow railway travelling would suffice to place them in a most healthy climate, and in the grandest scenery in the world. The total distance from the capital of India to Darjeeling is under 400 miles, 200 miles of which may now be travelled by rail. With a continuous line and express train, the high officials and merchant princes of Calcutta might dine at home, and breakfast next morning in the hills, while the sick sailor and artisan could reach the same delightful and invigorating change in twenty-four hours by Parliamentary trains. It is no undue partiality of mine for the sanitarium I have had most to do with that induces me to press this matter on your attention; nor have I any personal object whatever to serve by doing so. The facts of the case—and they are painful ones—are all I appeal to, and if any one desires explanations on the subject, or further particulars, it will *give me the greatest* pleasure to meet their wishes. Mr. Clarke has put the matter very strongly and well before you. Mr. G. Campbell has, I think, underrated the importance of this matter, and over-rated the expense of remedying the evil. It is not for the necessities of Darjeeling alone that a railway is wanted. It is to give the blessing of healthful change of air to the sick of Bengal that it is so urgently wanted; and instead of four or five millions being required, I have an idea that less than a million would give a single line from Rajmahal or Caragola to the foot of the hills at Darjeeling. But Mr. Turnbull, who opened the East Indian Railway so successfully, and knows Darjeeling well, can say more to this point, and I hope he will do so. The choice of a line lies, I think, between Rajmahal and Caragola. The proposed one from Koostea is twice the length, and not so likely to be a paying one. The engineering difficulties on the lines communicating with the East Indian Railway are confined to bridge work, for the country is very flat. From Caragola to the foot of the hills there is a wide roadway laid down by Mr. Login, C.E., now present, the curves and gradients of which are suited to laying rails on, should that line be adopted. The road, however, is not metalled nor efficiently bridged, so that the means of communication in the rains is dreadfully bad. I have shown how injuriously and unjustly the want of a railway affects invalids and soldiers. The obstructions to commerce are also excessive, but Mr. Ward will, perhaps, enlighten us on this subject.

Mr. T. Login said—I venture to bring forward some facts on this important question, brought before us by Mr. Hyde Clarke, which I trust will be of some use in enabling us to arrive at some practical conclusions on the question now under consideration. Some twelve years ago, I made some careful inquiries concerning labour in India compared to England, and I arrived at the conclusion that an up-country beldar can perform three-fifths of the work done by an English navvy. Now, as the average price of wheat in England may be taken at 60s. a quarter, or eight seers per rupee, the price of food here, under ordinary circumstances, may be said to be three times that in India, where usually wheat sells at twenty-four seers per rupee. Consequently, a labourer in India can live and support his family at one-third the cost, as to the staff of life; but, as the average pay of a navvy is about fifteen shillings a week, or thirty rupees a month, and that of a beldar is hardly five rupees a month, the cost of labour as to money in England is six times what it is India. Therefore for one-sixth the pay we get three-fifths the actual work done; that is, in India a labourer receives only five rupees for work which in England would cost eighteen rupees, or the English navvy receives $3\frac{2}{3}$ times as much as the Indian labourer for the same work. But as to the price of food in England (taking wheat as the standard), the

English labourer is rather better paid than the Indian coolie, and consequently is better fed and clothed, for in India cloth costs more than here, though, happily, in India the coolie does not require so much clothing. This is taking the most favourable state of things, where the labourers are paid by job-work, but if we descend in our comparison to the agricultural labourer and the village coolie, the comparison would still be in favour of the English labourer. Now, no one can suppose that an English workman could perform three times the work if food was three times as cheap, even here in England; and, in a climate like that of the plains of India, it is probable he could not perform anything like the same amount of labour that he could in his native country, let the price of food be ever so cheap. The deduction is that, throughout the plains of India, European labour cannot for one moment compete with the labour market in India. In among the hills, however, the circumstances change, for there we have only a very limited supply of workmen, and to induce men from the plains to go and work among the hills we must raise their pay, so the European comes to have a somewhat better chance of competing with the Indian coolie, for he is in a climate where he can do out-door work all day long without injuring his health, and the little experience gained by employing European soldiers among the hills supports this view of the case. Surely no one will say that a soldier who has done a good hard day's work out of doors, and is paid for it, can be a worse man or soldier by having done so, if he is better able to support his family, for surely the soldier is worthy of his hire, and should be paid for what he does, as well as any other class of men. In a pamphlet which lies on the table I have gone into the question of communications in India, which goes to show that, in a commercial point of view, railways can convey troops and munitions of war, as well as merchandise, cheaper and faster than by roads; so financially there is every reason why this network of rails should be carried out to completion with the least possible delay. Once this has been accomplished, and what then? Are we to continue our present system of cantoning troops near large Indian cities, the hot-beds of cholera and fevers, not to speak of the immoral dens of vice in our bazaars, where diseases are contracted that ruin both body and soul? It is said that it is necessary that the natives of India should *see* before they will believe that there are European troops in the country, and no one is more satisfied of this than I am. The question is, cannot our troops be *seen* without exposing them to the unhealthiness of a cantonment near large cities, and all its concomitant evils? Is it necessary that the natives should not only see the European on the parade-ground, but also that it should be an almost every-day sight to see a poor unfortunate soldier intoxicated in the bazaar, thus lowering us individually and collectively as a nation, in the Asiatic's eye. Once there is a network of railways, with branch lines to the foot of the hills, to all the military stations among the hills, in less than one week our troops could be marched down, and an army collected at any point, with the same expedition as if they were scattered over all the cantonments of India; and is not a man living in a European climate all the hot season, removed from the heat of the plains, better able to withstand the fatigues of a campaign than one confined in a hot, close barrack-room for twenty out of the twenty-four hours? But what of their families? We see a poor set of children, sickly and pale, with a mortality amongst them that is frightful to contemplate, while those at the Lawrence Asylum are as rosy as children at home. I believe that, by following the valleys of most of our main rivers among the hills, a good cart-road can be constructed of some five or six days' march, that would reach a sufficient elevation, and be, in a great measure, beyond the excessive rains of the monsoons; and, by establishing military colonies at such spots, not only would the troops be in a climate where they could take out-door exercise all day with impunity, but they could be usefully employed in making roads or building their own cottages, and thus have the pleasure of seeing spring up about them a healthy generation. In the cold season, camps of several thousand Europeans could be collected, and, after a few weeks spent in reviews and other military duties, near some large city, in one day the camp could be struck, and next day another camp formed near some other city 100 miles off. By this means the native population would have ample opportunities for *seeing* much larger bodies of Europeans than ever they have done heretofore, and the troops would be improved by having to act together in large masses, and at the same time the railway establishments would be broken in to know how to move on large bodies of troops without necessitating commanding officers to place in arrest station-masters, as at Howrah, in 1857. To carry this out, instead of building large expensive barracks that are easily demolished and cannot be defended (remember Meerut and Cawnpore), there will require to be small forts, armed with the heaviest artillery, that could be held by a company of Europeans, and at one and the same time overawe the neighbouring city, and give protection to the civil station, affording shelter in time of need to the European population. Thus, whether an insurrection should break out, or there should be a frontier war, the troops would know that those left behind would be comparatively safe, which they are not at present. Not being a military engineer I cannot venture to give an opinion as to how these small forts should be built and defended, nor as to how the hill stations should be be laid out so as to ensure proper military discipline, of which I am supposed to know nothing; but I could venture to express an opinion as to how roads should be made, and how to get a water-supply. I have, however, already occupied too much time, and cannot now enter into these two important subjects, but must confine myself to saying that for roads the gradients should never, except for a hundred yards or so, exceed 1 in 25 feet; and that the supply of water should be brought in by a closed canal, at a high level above rather than below the station, while the stations themselves should not be exposed to the full beat of the monsoons. To secure these advantages the roads should ascend the valleys of rivers, and the stations be situated on the spurs of hills which rise 1,000, 2,000 or even 5,000 feet higher than the station, so as to afford a constant supply of good water at high levels, while at the same time this high hill would protect the station from excessive rain—points which have been lost sight of in selecting most of the old hill stations. If 15 gallons a head, or, in round numbers, say 150 lbs. of water, has to be carried 500 feet up hill for every man, woman, and child, the expense of conveying this water up to the top of the hill can be imagined. And if a less quantity than is found necessary in England be used, we can form our conclusions as to the effect this scarcity of water must have on our troops. When, however, it is also known that this very water is also often impregnated with organic matter, is it to be wondered at that we hear complaints of many of our old hill stations? In conclusion, I hope that the subject Mr. Hyde Clarke has brought before us will not be allowed to drop, as the future prosperity of India, I believe, greatly depends on hill sanitaria.

Sir Andrew Scott Waugh said he found he had been anticipated by preceding speakers on almost all the subjects he could touch upon. Dr. Campbell had said that the transition from the plains to the hills in India was perfectly delightful; it was, in fact, a transition from the infernal regions to paradise. He did not believe any person who ever ascended in one hour, as he had done, from the climate of India to that of England, had ever dreamt of anything else but how delightful it would be to colonise those spots with Europeans; and he believed every commander-in-chief, every governor-general, and every officer in command of the hill districts, had had an eye to this great desideratum. If it could

have been done by Aladdin's wonderful lamp, it would no doubt have been done, because the government of India had been most willing to do what everybody had desired. Sir Henry Durand, as commander-in-chief, went to see if he could not settle troops in the hills, but everything had to be done at the beginning. It was a *terra incognita*. Roads had to be made, and only those who know what the climate really is could understand how long such a work took. The first European troops were located on a ridge of the hills. On the Himalayas there was a regular land and sea breeze; it blows all day from the plains, and all night from the snowy mountains, and that must be very salubrious. But they had to consider that the climate was of that peculiar nature that there were three months of extreme cold, three months of extreme drought, and three months of extreme wet, and all vegetation must undergo great transitions from wet to dry, and from heat to cold. He had seen all the fruits of England progressing favourably, then came the monsoon, and they never saw the sun again for three months, and so they remained unmatured. It seemed to him that the mistake made was in selecting the ridges for stations, and that it would be better to select hills with partial snow at the summit and plenty of water, so that they would have water from above, instead of bringing contaminated water from below. It was mentioned by Dr. Campbell that a colony could hardly remain as an English colony. In fact, an Englishman could not exist in India under a certain amount of annual income. If he kept a footman or butler the cost would be £60 or £70 per annum; and, unless English colonists could be employed in some way, they would only appear to the Indian population as a lot of broken-down Europeans. He recollected the German missionaries mentioned by Dr. Campbell; they appeared to have prospered very well, and a favourable opening seemed to have presented itself for them. The government formerly could not move many of the troops to the Himalayas, because a certain portion were required in the plains, especially when communications were difficult, but now that they were easier, and there were more European troops, the greatest blessing to the troops and to India was to locate them in the mountains. It would no doubt be very desirable if we could breed our own recruits for the army. If we did not breed Englishmen, they would be men almost as good; in some respects they would be better, for they would have the wind and limbs of mountaineers, and be able to climb well. He had no doubt that would eventually be done, but, to enable it to be done, he wished the word "barracks" were expunged from the English language; it had done more harm to the soldier than anything else. The noble Lord in the chair, Mr. Campbell and others, who had served in India, would recollect how picturesque were the cantonments of the Sepoy regiments, where each man was monarch of his little house, surrounded by his family and small garden. He believed that could be done at less expense than building large palatial barracks. Those built under Sir Charles Napier, he believed, cost from £150 to £180 per man, while they could build cantonments, of the kind he referred to, at about £30 or £40 per man.

Mr. C. H. Fielder said, on looking over the report presented by Mr. Ewart's Committee to the House of Commons, it struck him that the recommendations contained in that report were almost identical with the pith of the discussion which had taken place up to this time. He was sorry to find, from the remarks that had fallen from official gentlemen recently returned from India, that few if any steps had been taken by the government at home or in India to carry out those recommendations.

Mr. Samuel Ward was pleased to find that the question of railway communication between Calcutta and Darjeeling was receiving some attention. A great advantage would be gained, in a commercial point of view, if the produce could be conveyed from Darjeeling to Calcutta more readily than it was at present. A railway from Calcutta to Darjeeling was most desirable, independent of economical considerations, for all classes of European residents in Calcutta.

Sir Charles Trevelyan, K.C.B., said his first acquaintance with hill stations in India was in the year 1830, when he went with Lord William Bentinck to Simla; and, after more than a generation, he paid a second visit. It might be interesting to the noble Chairman and others to know what changes he observed there. The place remained substantially the same. Its character had been fixed for ever by "the everlasting hills." There were many more houses; there were more roads and better, and the old roads widened; and, above all, the beautiful carriage road from the plains had been made by Colonel Kennedy. Commercial development there was none; means for it did not exist. The country, no doubt, was suited to tea cultivation, but less suited than other parts. There was a tea plantation at Kotegurh, a few miles from Simla, but in the immediate neighbourhood there was no possibility, as far as he could see, of commercial development. Of colonisation, properly so called, also there was none. In fact, the merit of the place lay in its extreme beauty; and, if proper sanitary conditions were observed, its extreme healthiness. It was one of the most glorious places in the whole world. During the long interval of thirty-two years, he had seen all the places of greatest mark in Europe, but he had seen nothing that could be compared with this beautiful region of India. All of them fell far short of Simla. There was that magnificent chain of snow-clad mountains, the highest in the world, stretching from Cashmere to the sources of the Ganges and the Jumna, like a screen half-way to heaven. There was the beautiful rhododendron forest, and he begged to compliment the noble Chairman upon the great care taken of that forest, which he found, after thirty-two years, more flourishing and more primitive, so to speak, than when he left it on the first occasion. Then he would mention the extraordinary cloud scenery. He never saw anything like it. From his house, looking down the valley, he frequently saw a magnificent dark cloud stretched across the valley from hill to hill, with the rain falling from it into the valley, and the sun shining through this charming lace veil. At other times clouds formed a bridge over a gap in the hills, and, while all was dark and gloomy above, the sun was seen shining through this gap in the most delightful manner.

Then in the year 1859-60, in the course of an official tour, he visited the Neilgherries and the Pulneys, and stopped some time at each. The Neilgherries, though quite in a different way from the Simla hills, were very remarkable. The Neilgherry plateau was advanced, like a magnificent bastion, into the plains, with Dodabet, like a gigantic watch tower, dominating over the plains and table-land of Mysore itself. Then there was that remarkable Palghat gap in the Western Ghâts, through which the railway was carried, separating the Neilgherries from the Pulneys—an admirable natural arrangement which made a high road across the mountains to the western coast possible, and allowed the monsoon to spread over the plains of India, producing the climate which made the Madura and Tinnevelly cotton so famous. The Simla hills were all in ridges. It was, figuratively speaking, difficult to find a resting-place for the sole of one's foot upon them. One clung to the hill as to the roof of a house; but it was different in the Neilgherries. Here was a great undulating table land, quite open except in the hollows, filled by woods of extreme beauty, which never receded and never advanced, but remained just as they were probably thousands of years ago. The plateau was quite destitute of population, except those strange people, the Todas, a sort of barbarous Normans, who had lorded it over the inferior races occupying the side of the mountains. They were a shepherd race, who offer no obstacle to settlement. As we advanced they receded, and were thankful for the provision we made for them.

The health of the district was excellent. He (Sir Charles Trevelyan) did what he could to promote the removal of the great Military Orphan Asylum from Madras to the Neilgherry hills. This had since been accomplished, and he regarded it as a great measure of colonisation, and he hoped it would be followed by the removal of the Female Asylum to the same locality. Here there was a solid foundation for commercial and industrial prosperity, coffee cultivation being the great staple. The produce was of excellent quality, and might be grown with profit to any extent, the demand of Europe for this article being constantly on the increase, and the region suited for coffee cultivation in Coorg, Mysore, Wynad, and the Neilgherry and Travancore Hills being practically unlimited. European colonisation in the Neilgherries approached nearer to the Australian and American type than anywhere else in India. Europeans could live there out of doors all the year round. The climate was invigorating. The residents had abundant means of employment and subsistence, and the Madras Government had been liberal in their arrangements for giving security of tenure, at moderate quit-rents, in a manner acceptable to the planters. A considerable amount of colonisation had taken place, and it was still going on in a satisfactory manner, through coffee planters, through a large number of retired officers, and also through the schools, the latter being a very interesting feature.

The admirable climate of the district showed to great advantage in the younger portion of the population. He spent several hours on one occasion at a school established for educating young East Indians for the telegraph service. They were taken from the sultry plains of the Carnatic, and he was pleased to find that they acquired in the hills the robustness and heartiness of the English constitution, and the same appeared even among the natives. Those who followed us to that cold district were obliged to wear warm clothing, and to eat more animal food, and they became stouter and stronger than the natives who remained in the plains. The Todas themselves were also remarkable specimens of the excellence of the climate. Physically, they were almost like a race of giants, and the women were strong in proportion. As far, therefore, as the Neilgherries were concerned, everything appeared to be going on admirably. A separate commissionership had been established, to give the advantage of local administration; and, even if our Indian empire were to be rent asunder to-morrow, he believed an important self-sustaining fragment would be left there; but surviving, as he believed it would, for generations to come, and continuing to grow and develop, he looked to the Neilgherries as a source of solid strength, as a sort of bulwark of European power and Christian civilisation in the south of India.

Some remarks had been made about military colonisation, by which he understood to be meant organised systematic military colonisation; that was to say that entire military bodies should be assisted to colonise. He thought it was a mistake to take any body of men whatever, and to turn them into ready-made colonists. The work of colonisation was one which all were not capable of. It required special personal qualifications, and the manner in which our English soldiers were cared for and looked after was not favourable to the formation of the self-reliant habits which are so necessary for colonists. Of course, a considerable proportion of European soldiers were qualified to become useful and successful colonists, and they did become so. They percolated, as it were, into colonisation; but to encourage them to settle in a body, and to assist them with little outfits, was a mistake. It had been tried, and failed over and over again. During his experience at the Treasury, two remarkable instances had come under his observation—one in Canada, and the other in New Zealand. Both were dead failures, and he attributed it to the fallacy of supposing not merely that military, but that any body of men as a class, were fit to be colonists.

He also visited the Pulneys. Phulney (Phalni) meant "flowery," and anything equal to the flowers there he never saw. The roses and geraniums, originally planted in a few private gardens, had spread themselves on all sides, and had literally become brakes, like the furze brakes in England. The roses had become single, as they did without cultivation, like the dog-roses here, but they were very sweet-smelling. The feature alluded to by Sir A. Waugh existed here in a more decided manner than he ever saw it elsewhere. He zigzagged up the side of an almost perpendicular mountain, and, in two or three hours, passed from the sweltering heat of the plains into a delightfully temperate climate. The first decided symptom of having changed the climate was the bracken fern. He cut it across the root, and there was the old familiar oak tree. It struck him that it must be the work of Almighty Wisdom that had placed in the heart of India the identical plant which abounded in our parks in England. The tree fern also existed there in great perfection; and there was another remarkable phenomenon, viz., the natural bridges. The coarse grass and turf were exceedingly solid and tenacious; the streams burrowed beneath, and in course of time these natural bridges were formed. He had passed over several of them. These hills were as yet undeveloped. There had not been a road made in the interior of the hills, but now arrangements had been made for the extension of the Great Southern of India Railway by a loop-line into that district, so that probably, before many years, we might hear more of the Pulneys.

Mr. Edwin Chadwick—It appears to me that the free scope given by Sir Charles Trevelyan to the feelings of the pleasure of temperature and of the sense of sight, require correction from sanitary experience, and the warnings yielded, in urban districts at least, by the sense of smell. He has spoken in glowing terms of Simla. Now, in further justification of the mention I made of it in our previous discussion, I beg to cite a passage from a report of the Sanitary Commissioners for Bengal, which is in the following terms:—"In connection with the very unsatisfactory condition of Simla, the whole question of the proper means to be adopted for the conservancy of hill stations was considered and reported on. There can be little doubt that arrangements for securing the proper sanitary condition of such sanitaria have been hitherto much neglected, and it may be questioned whether the affections of the bowels, which have been considered as endemic in the Himalaya, may not in some measure be due to the contamination of the water supply. That the water was contaminated in the foulest manner possible was a fact admitting of proof only too clear. The dry beds of the mountain torrents were used as places of convenience, to have their contents swept down by the rain. In many places the spring from which drinking water was obtained lay beneath the brow of a hill, which was frequented for the purposes of nature by the servants of the neighbouring houses. It was shown, moreover, that sheep were allowed to feed on the hill sides, on food too disgusting to be mentioned. How these revolting practices could be put a stop to was pointed out by the Commission. The provision of latrines, both public and private, the guarding of the purity of the water supply, and the necessity for generally improved sanitary administration were insisted on. There was too much reason to believe that other hill-stations were in no respect better managed than Simla, and that a decided reform in the arrangements regarding the public health was urgently called for in them all." This is a very mild account of the results set forth in other reports as to the hill stations, yet it serves to contrast the impression now given of this one station as a specimen sanitarium, and it is a specimen of the corrections requisite to the like current statements. By neglect of the most rudimentary sanitary principles in administration, naturally good sites are made bad; whilst by proper applications of sanitary science, naturally bad sites may be made good and habitable even in inferior climates. In illustration of what I

stated in relation to the common causes of infantile mortality in India, I present the following statistics from the last report of the Madras Sanitary Commission, as to the sickness and death in hospital of 2,090 children of British soldiers at one station. The total number of these children taken to the hospital was 1,470, of whom 166 died there.

A Gentleman—That is in the plains?

Mr. Chadwick—Yes; it is a common specimen return of results that pass without notice, as if they were of course, but an examination of the causes of this immense sickness and heavy infantile mortality, denotes what is to be done in India. The statistics state that, "of the admissions, 1,101 are of the zymotic, *i.e.* the fermenting class, or more than half the total number admitted; 188 are of the constitutionaal class; 109 local, and 72 accidental affections. Of the zymotic affections, 1,075 are of the miasmic order, and 26 parasitic." Now, anyone with a competent knowledge of sanitary science will be aware that the great mass of this disease—the miasmatic disease—is certainly preventible; and that the authorities in charge ought really to be, and in time will be called to account for permitting it. The ignorance that assumes these ravages to be inevitable, and that children cannot be be maintained, or British soldiers or others labour or live anywhere but in the narrow hill-stations, is most deplorable. Stamp out all this foul air and filth-disease, as a proper executive would do, and the children of British parents may be brought up to the common sanitary condition and chances of life of at least the urban population at home, if no higher. Upon examination of the facts, I see no better real foundation for the common lazy dogma of the utter impossibility of rearing British children in India, than there has been for the doctrine some have held, of the essential unfitness of the British soldier, or of the artisan, to work even in the plains of India. I was glad to see it stated in the last report of the Madras Sanitary Commissioners, that the construction and the improvement of the roads in the Himalaya, between the stations of Murree and Abbotabad, have been continued by a party of the 79th Highlanders. From the 21st of May up to the 21st of October, upwards of 600 of the men of this regiment were employed in this work. After adverting to a question of the financial result, the commissioners state "a very considerable indirect cash saving may thus be said to have resulted from last year's operations, while the benefit to the regiment itself has been very great. From being sallow, weakly, and unhealthy, the men soon recovered the effects of the fever they had suffered from at Peshawur, and became ruddy and robust. Out of thirteen women who were with the working party, not a single case of sickness occurred." Now, why cannot such conditions be extended and maintained, for women and children as well as for men? In reference to what I said as to the extent of the prevalence of the miasmatic and foul-air diseases in India, and as to testing the local administration by the nose, I may mention that a lady, in her travels through India, states that, in night-travelling, she knew they were entering into a town by being awakened by a bad smell. In the advance of public administration, and the knowledge of sanitary science, and after due warning, when a Governor-General makes his progress, he may be guided with certainty by his sense of smell, and, when meeting with such causes of offence to it, may call upon the officer in charge, tell him justly and decidedly, "Children die away! there can be no succession here! you must go."

Sir Charles Trevelyan begged to say a word in explanation. The view expressed by Mr. Chadwick was present to his mind when he said Simla was very healthy, *subject to proper sanitary conditions*. He was aware of the neglect of those conditions which had taken place, and attention to sanitary arrangements was as necessary in the hills as in the plains—in one respect more necessary, because the crowding was greater in the Simla hills than in the plains. The space available for habitation was so contracted that it was almost as necessary to have proper drainage and ventilation as in the crowded cities of England. The first occasion when this evil became apparent was long ago, when the troops were first placed on the Simla hills. Long ranges of sheds were constructed for them at Dughshaie, and it was taken for granted that, because they were in the hills, they must be healthy; but, after a time, the men became more unhealthy than in the plains, and then it became evident that some sanitary regulations were necessary. He omitted one point in his previous remarks, viz., the experience of Southern India with regard to hill stations for the troops. The great military hill station there was at Wellington, in the Neilgherries. It was the only one, and a great deal of discussion had taken place as to the proper use to be made of that single hill-station in the south of India. He had no doubt himself as to what was the most advantageous use to which it could be turned. It was not to put a regiment there in its entirety, and to keep it there for a length of time, and *then to send it* back to the plains, and to send up another regiment. In the first place the change was severe, from heat to cold, and from cold to heat again. The men did not like the hills. They had no occupation. The full tide of human existence was wanting; and many instances had occurred of offences being committed, solely because they were dull, and wanted to be sent away. The true mode of using that hill-station was in the same way as it was used by the upper classes of civil and military officers, viz., by those who required it; and, in every regiment in the south of India, men who had been some time in the country, and wanted a change, were sent thither for as long a time as it was likely to be of service to them.

The Chairman said that they must all agree, whatever they might individually think of Mr. Clarke's able paper, in thanking him for the very interesting discussion it had given rise to. In that paper Mr. Clarke had endeavoured to enforce attention to the value of European settlements in India, and he proposed to accomplish this by having military and civil establishments permanently placed there, by instituting military colonies, and by the encouragement of trade with Central Asia, by which he thought merchants would be induced to settle in the Himalayas; and he went on to say he thought government was not alive to the importance of this matter, and, in evidence of that, mentioned that no military colonies had hitherto been established in the hills, though advocated by Indian authorities; that the subject of railways had been neglected; that no hill territories had recently been added to those available for European settlers—and mentioned Cashmere and Nepaul; and then went on to say, which was quite true, that not one-fifth of the troops were stationed on the hills, notwithstanding that it was recommended by the committee who investigated the matter. There was a general concurrence of opinion as to Europeans being settled throughout the hills; and it must have struck every person who had given attention to this subject when it was considered, that we have a country in India of the size of Europe, taking Russia out of it, and that it was held in subjection by a number of Europeans amounting, including the army, to not more than about 101,000. The last census showed that the troops amounted to 60,000, and that the other Europeans, settled all over *India, did not* number more than 39,516. Now, everyone must agree that our strength in India would be enormously augmented in proportion as European settlers were increased, not only materially augmented but morally, as Mr. Clarke said, by establishing centres of civilisation throughout the hills, wherever Europeans were located. This question of colonisation was attracting at this moment the attention not only of our own government, but those of the French and the Dutch. The former only lately issued regulations with a view of attracting Frenchmen to settle in Algiers, in preference to going to America, so important was it considered to increase the number of

settlers; and the Dutch were endeavouring to do the same with regard to the island of Java. Therefore, everyone would concur with Mr. Hyde Clarke in thinking it was a most important question, how best we could accomplish this object. But when we came to this point the difficulty arose. One speaker remarked how little had been done to utilise the hills, and proposed that the civil and military establishments should be placed there. Mr. George Campbell had pointed out that we had already gone as far as we could in this direction, and everyone who bore in mind the occurrences during the Orissa famine, and other circumstances in Bengal, would feel that it was possible to go too far in having civil establishments in the hills. With regard to the paucity of European soldiers located on the hills, he thought there was fair ground of complaint, because, though the expense of such establishments was great, and, no doubt, military considerations, the importance of which would be seen by looking at the map, stood in the way of having too many troops in the Himalayas, and also the observations of Mr. Campbell and Sir Charles Trevelyan, that the soldiers did not care too much to live in the hills, because it was extremely dull—in fact he could only compare a military station there to the picture of Noah's Ark on the top of Mount Ararat, and about as lively—he said, notwithstanding those considerations, he felt that Mr. Clarke had ground of complaint that so few of our troops were stationed in the hills. He made up an account at the India-office the other day, and, as well as he could make out, last year there were not more than 5,059 soldiers stationed in the sanitaria of India; therefore, instead of one-fifth, the number did not amount to more than one-twelfth of the total number of troops, and that was a thing they had a right to complain of. Then, with regard to military colonies, he was not sanguine about them. In the first place, there was very little land available for the purpose. Cashmere and Nepaul we could not get hold of; we had done everything to prevent their annexation. He (the Chairman) could not imagine a more fit way of employing soldiers than upon works which would increase their pay, and make their life in India more agreeable to them. But, on the other hand, he did not see clearly how we were to turn the European soldier into a settler. He doubted whether, once taken out of the regiment, he would submit to the sort of discipline which a military colony involved. It might suit the French; but the proper military colonisation of Algiers, so far from being a success, had been a failure, as far as he could make out. As long as the men in the regiment were employed he thought the greatest possible advantage would be derived from that mode of settling soldiers in India, indeed, he did not think we had gone far enough in that direction. He would like to see them employed on the railways, and the management of estates and coffee plantations, and those who were not qualified for those occupations might be employed in constructing roads, of which there was so much need in the Himalayas. In that way there was reason to hope much might be done. Then, with regard to ordinary settlers—civil colonists, in contradistinction to military—it was clear the government could not interfere so as to make tea and coffee planting renumerative, but they could do a great deal to prevent such undertakings becoming losses. They could remove many obstacles which stood in the way; they could improve the roads and do other things which he need not refer to. To show what progress had been made in reference to tea and coffee plantations, he would mention that, in 1858—ten years ago—there was £99,000 worth of coffee sent from India, whereas, in 1866, the quantity had increased to £785,000, or nearly £700,000 increase. In tea, in the same way, in 1858, the export was of the value of only about £53,000, whereas, in 1866, it amounted to £309,000. He had looked at a paper written by Mr. Clarke, ten years ago, on this subject, in which he pointed out the different obstacles which stood in the way of European enterprise in India. Of these, four were mentioned, and it would be interesting to see what had been done to remove them during the ten years. The first was the great expense of locomotive transit; secondly, the climate; thirdly, legislative prohibitions, on which he laid great stress; and fourthly, hostility and indifference on the part of the government. Now, with regard to the means of transit, he (the Chairman) would point out that, whilst in 1858 there were only 560 miles of railway open in India, last year there were 4,100 miles open. Although that was not so much as they hoped for, still that could hardly be called indifference on the part of the government. Then, with reference to legislative prohibitions, they had, he thought, been removed; indeed, a French merchant, who reported on India the other day, pointed out that legislation in India, in respect of the law of partnership and limited liability, was highly favourable to the introduction of foreign capital into India, much more so than in our own country. Then, again, with regard to hostility and indifference on the part of the government, he did not think they could be charged with anything like hostility in the present day, and, as for indifference, he did not think that could be said against them. Perhaps, in respect of roads, there was some colour for the charge. Mr. Ward pointed out the great advantages that would be gained by having a railway to Darjeeling. Whether the trade of that district warranted the construction of a railway at present he could not say; but this might be said, that the tea of the Himalayas and the coffee of the Neilgherries could be grown at greater profit than at present, if there were good roads connecting them with the railways. There was a road commenced, which went by the name of the Dalhousie-road, the object of which was to connect the plains of India with Thibet. It was made about halfway over the Himalayas and left in that condition. If, instead of one road half across the Himalayas, two roads had been carried across at different spots, no doubt the tea-planters of the Simla and Assam hills would have been in better plight than they are. There were other ways in which the government might assist, without committing any breach of the rules of political economy. Take the question of cotton. That was an article for which there was an enormous demand in this country, more especially since the American war. To develope that industry in India, only about £200,000 had been spent by the Government within the last fifty years. It was nothing considering the magnitude of the matter in hand; and, during that time, there had been only two cotton commissioners and four gardeners appointed to improve its cultivation. Mr. Ayrton had made a suggestion which he preferred to that of Mr. Clarke. The latter gentleman suggested we should have something in the shape of an English commissioner, while Mr. Ayrton advocated a member of the Council of India for agriculture and commerce. He thought the latter was preferable, inasmuch as it would establish a separate department, which would look after the interests of those who showed a disposition to settle themselves in the hills, and would give them valuable information. At present, he was sorry to say, there was scarcely any information to be got. He sought to ascertain at the India Office the amount of waste lands in the hills in India available for settlers. He could get some information with respect to the Himalayas, but none whatever—or it was extremely scanty—about the Madras Presidency. In the Himalayas, he ascertained, there were not more then 253,000 acres—he should have supposed it was much more; at Simla and Derra Dhoon, 44,982 acres, and he understood about 20,000 acres more had been taken within the last twelve months. However, comparing 1868 with 1850, he thought there was some ground for encouragement, and, if greater results were not shown, the answer must be—not that the government was hostile, though it might be a little indifferent, but the climate. He thought that was the great difficulty they had to contend with in India. It was true the government could, to a certain extent,

influence the effects of the climate by good sanitary regulations, by irrigation works, and the clearing of jungles; but, with all that could be done in that way, the climate would always be unsuited to European constitutions, and India would never be an agreeable place of residence for them. It was women and children who were most affected by the climate, and the mortality amongst them was as great as ever. Two years ago, the mortality amongst children was as high as 99 in the thousand. Again, the difficulty of education was greater than had been admitted. They could get children taught Greek and Latin, and they might obtain what was called a good education, but he was afraid one branch of education, the more important part, the forming of the child's mind—the moral part—could never be managed in a satisfactory manner in India. He therefore thought, on the whole, the climate was a bar to anything like extensive colonisation even in the hills. Mr. Chadwick had criticised the sanitary regulations with considerable severity, and he (the Chairman) admitted they were not perfect, but he apprehended that gentleman referred to reports some years old. [Mr. CHADWICK said it was the report of 1866.] He was sorry to hear such a bad account of Simla; but it seemed to him, looking over the sanitary reports for the last two or three years, the danger was in going a little too much in the direction of sanitation. Sanitary science was in its infancy—all we knew positively was that pure water and pure air were essential to health, and yet how little had we done to give effect to this simple truth. We might try to give the people of India good water. As far as he knew, nothing had been done to improve their wells. He could not but think, with regard to sanitary regulations, we had overlooked what we could do, and attempted to do what it was impossible to accomplish in the present infancy of the science. He might be thought to have taken a rather gloomy view of the prospects of settlers in India, but he had no intention whatever of doing so. No man was more conscious than himself of the great importance of this question. He felt one chief danger in India arose from the little root we had taken there. Our position reminded him of those great cedar trees so common in the Himalayas, with vast spreading branches, but which, owing to the nature of the soil, threw out their roots laterally, and took little hold of the soil; consequently, when a wind of more than ordinary violence came, a great tree, which it woud be supposed would stand any amount of wind and storm, went over with hardly any resistance. That was something like our position in India. We were a caste separate from the rest of the country, and therefore the great object should be to throw our roots down deeper into the minds of the people of India; and anything that tended in that direction deserved every support on the part of this country; and whether they agreed or not with all that Mr. Clarke and other gentlemen had advanced in this room, he was sure they would concert in saying that any person who placed one stone upon the cairn of our knowledge of this subject deserved their warmest and most cordial thanks. When he said the climate of India was unfavourable, he included, to a certain extent, the hills, because, though it was agreeable to strong and healthy Europeans, it had a debilitating effect upon some constitutions.

After a few remarks had been made by Mr. SAMUEL BROWN, on the rate of mortality in India, which he stated showed great improvement,

Mr. HYDE CLARKE said, in reply, with regard to the objections made, either to his mode of opening the discussion, or those who had supported him, it was not his intention to enter into any detailed answer, because he considered the objections, to a great extent, really came in confirmation of his position. He was relieved, under those circumstances, from defending himself with regard to the general remarks he had made as to the conduct of the government of India. With regard to the objections generally, when considered, they would be found to arise, to a great extent, from misapprehension. In the first place, with regard to site, the remarks on that subject went to this extent, that in some cases the sanitaria already existing were in unsuitable places, and not adapted for all useful purposes. That was tantamount to saying that, because one part of England might be unsuitable for a particular cultivation, there was no capability of its development in any other part of the country. The subject was such a large one that it could not be studied in single details, but it must be grasped as a whole. So likewise with regard to military colonisation, anyone who had gone into the history of the subject must arrive at the conclusion which Sir Charles Trevelyan and the noble Chairman had come to, viz., that military colonisation, in its general sense, was a thing which must fail, and had always failed, even when they took into account apparent exceptions; but, nevertheless, military colonisation, as applied to the hills, was capable of doing a great deal. If regiments were sent out to India with permission to settle there, they would have persons suitable for colonisation, who would remain permanently in the country. Then there was considerable scope likewise for small stations on the hills, in the manner of the system adopted by the Austrian Government. With regard to a Minister of Agriculture for India being preferable to his own proposition of a land commissioner, he might say that both were indispensable for India, and a subdivision of labour must be carried out, so as to constitute separate departments for agriculture and land. Whatever might be the extent to which any objections had impugned details, or rather corrected them, it remained clear that the occupation of the hills by Europeans is practicable, and that the Government had not accomplished all that is required. Much remained to be done, to bring up the troops in the hills to the one-fifth. As to the civil establishments being sufficiently in the hills, or too much, the reform would not be complete till the capitals of government are placed in the hills. The allegation that the Orissa famine was aggravated by the Lieut.-Governor being at Darjeeling, was only another form of reflection on the government for not providing full communication with the hills. There was a telegraph to Darjeeling; it ought to be within twelve hours from Calcutta, and as accessible to Orissa as Calcutta was, and the establishments ought not to be divided between Darjeeling and Calcutta, but concentrated in Darjeeling. Much misconception had arisen in this discussion by Indians not understanding the variety of forms of colonisation; they regarded a colonist as an agricultural labourer, digging and tilling the ground in a cold, arable country. They forgot the various climates and shapes of colonisation; sheep-farming in Australia, semi-tropical cultivation in Queensland, the employment of Caffres in Natal. India, on its varied surface, would afford scope for European enterprise and intelligence, although the agricultural labourer, "the out-and-out emigrant," cannot plough the barrens of Simla or Dugshaie. The more the matter was understood, within and without India, the weaker would the objections appear, and the more assured the results. He was quite aware that Cashmere and Nepaul are under native rule, but it was desirable attention should be kept directed to them, as an interchange of territory might be possible with Cashmere, and the course of events might cause alterations in our relations with Nepaul.

CANTOR LECTURES.

The third lecture of the course "On Applied Mechanics," was delivered by John Anderson, Esq., C.E., Superintendent of Machinery to the War Department, on Monday evening, the 26th inst., the subject being "Applied Mechanics in

relation to Natural Laws in Processes." Colonel Murray, R.E., was in the chair.

This course of lectures will be published in the *Journal* during the vacation.

TWENTIETH ORDINARY MEETING.

Wednesday, April 28th, 1869; Sir DIGBY WYATT in the chair.

The following candidates were proposed for election as members of the Society:—

Barnard, Clement, 2, Staple-inn, Holborn, W.C.
Beadel, Frederick, 25, Gresham-street, E.C., and Gidea-hall, Romford, Essex.
Brogden, James, Tondu-house, Bridgend, Glamorganshire.
Bunbury, Sir Charles J. F., Bart., F.R.S., Burton-hall, Bury St. Edmunds, and 48, Eaton-place, S.W.
Burch, Sampson Kingsford, 239, Vauxhall-bridge-road, S.W.
Burke, William Henry, 17, Newman-street, Oxford-street, W.
Cather, Rev. Robert G., LL.D., 8, Old Jewry, E.C.
Chatto, W. J. P., 23, Carlton-house-terrace, S.W.
Church, Jabez, Hamlet-house, Chelmsford.
Clarke, Joseph, 2, Earl's-court-road, Kensington, W.
Clarke, Rev. C. Pickering, M.A., 3, Adelaide-street, Strand, W.C.
Clarke, Robert G., 3, St. Alban's-road, Highgate-road, N.W.
Clover, Joseph Thomas, 3, Cavendish-place, Cavendish-square, W.
Clow, Leonard, 9, Fitzroy-street, Fitzroy-square, W.
Corderoy, George, 17, King William-street, Strand, W.C.
Corrie, J. M., 42, Lancaster-gate, W.
Crespin, Edgar, 28, Torrington-square, W.C.
Firth, James, 27, Shepperton-cottages, Islington, N.
Hackforth, Henry, 9, Bentinck-street, Manchester-square, W.
Vivian, William, Roehampton-lodge, Roehampton, and 51, Bow-lane, E.C.

The following candidates were balloted for, and duly elected members of the Society:—

Arter, Andrew, 8, Walton-villas, S.W.
Ashton, Joseph, 59, Fleet-street, E.C.
Barnard, George William, St. Phillip's-vicarage, Kennington, S.E.
Beamish, Captain H. Hamilton, R.N., 45, St. George's-road, Eccleston-square, S.W.
Benwell, J. A., 5, Upper-gore, Kensington, W.
Berthon, P. H., 20, Margaret-street, Cavendish-square, W.
Birch, Charles Bell, 12, Alpha-road, N.W.
Biss, William H., 25, St. Stephen's-road, Westbourne-park, W.
Bisson, F. S. de Carteret, 24, Charles-street, St. James's, S.W.
Boekbinder, J. M., 49, Thornhill-road, Barnsbury, N.
Borrett, Thomas, 15, Bryanston-square, W.
Bowyer, James, 10, Tavistock-square, W.C.
Boyer, Joseph, 4, Codrington-terrace, Notting-hill, W.
Bradley, Charles Lawrence, 4, Belitha-villas-west, Barnsbury, N.
Breach, James G., 14, Prince of Wales-terrace, Kensington, W.
Brett, Edwin J., 311, Camden-road, N.
Brittain, Thomas, 22, Cleveland-road, Downham-road, N.
Brucciani, Dominico, 10, Onslow-gardens, S.W.
Buckingham, J. H., 35, Wood-street, E.C.
Burr, John, 8, Bolton-road, St. John's-wood, N.W.
Cochrane, Alexander Baillie, 26, Wilton-crescent, S.W.
Cockerell, William, 3, Pump-court, Temple, E.C., and Cambridge.
Durrant, George C., 20, New Bond-street, W.
Lacey, Charles J., 1, St. John's-villas, Haverstock-hill, W.
Todd, Arthur, jun., 30, Milk-street, E.C.

The Paper read was—

ON THE DUTIES OF AN ARCHITECT, WITH REFERENCE TO THE ARRANGEMENT AND CONSTRUCTION OF A BUILDING.

BY T. ROGER SMITH, ESQ.

The nature of an architect's duties with reference to the arrangement and construction of a building; in other words, the routine of his regular and most familiar professional work, is the subject which I have ventured to think it may be worth your while to consider this evening. There is much which becomes customary routine to the practitioner of any art, which it is yet well worth while that those should know who may have to criticise his works, or to avail themselves of his services, or who may think of his profession for their sons. In the case of many manufactures and arts, which are by no means of universal or even very general application, this sort of information has been eagerly sought and fully diffused; but, familiar as we all are with buildings, there exists good reason for supposing that by many the nature of an architect's work is less thoroughly understood than might have been expected: I have, consequently, thought that an endeavour to make quite clear what he can, and what he cannot do, would be of service. In this inquiry I propose to take a familiar example, that of a dwelling-house of good size, and to trace its history from its commencement to its completion, showing at each stage the share which the architect takes in the work; and I shall illustrate what has to be stated, by exhibiting the actual working and other drawings, &c., of a building of this sort, recently completed by myself.

Suppose, then, that an individual is possessed of a site, (probably recently bought), and of the needful funds, and is minded to build himself a house. We will further suppose, for the sake of simplicity, that this is a country site, and that some circumstance points out beyond question one particular situation on the estate as proper for the building, so that no trouble as to selection of the exact spot has to be encountered. The question immediately to be solved being what sort of house to build, and how to set about it, the first step, in all probability, will be to visit, or at least to think and talk over some houses already known or known about; and probably, according to the degree of constructive skill or draughtsmanship he possesses, the intending proprietor will make some sort of sketch, or model, or other design. This will not have been carried on far or long without the question of obtaining skilled assistance being thought over; and either from a general idea that it is the right thing to do, or from a real knowledge that trained special skill is indispensable to the success of such an undertaking, we will suppose that it has been decided to call in an architect.

It is foreign to my purpose to say anything about how the architect is selected, though it is fair to add that the selection is a matter of considerable importance. In the case of public buildings, competition is very frequently resorted to; this is rarely done in private practice; and, in order to trace the course of a design produced under the most favourable and natural circumstances, it will be best to suppose that the architect is consulted at the commencement of the undertaking, and entrusted with the work from the very beginning, not in consequence of his design having been chosen in a competition, but in consequence of his ability and integrity being known by the person intending to build.

The first step, after the architect has received some preliminary instructions as to the general nature of the building wanted, will be for him to visit the site. It is, perhaps, best that he should be able to form some very vague general idea of the size and sort of house intended,

before visiting the ground it is to be built upon, but no wise architect will put pencil to paper, without first seeing where his future work is to stand, and what will be near it, and studying the peculiarities of the site with some care, or (if that be quite impossible), without trying to form a good idea of it from maps and photographs. The points to be specially noticed on a site are the aspects obtainable for different rooms, and prospects from different windows; the peculiarities of shelter or exposure; the approaches, and space for gardens, grounds, &c.; the facilities for drainage and water supply; the dryness or dampness of the site, and its levels; the nature of the building materials within easy reach; and such local peculiarities of surrounding, or association, or character of scenery, or of neighbouring buildings, as influence style or design. It is now necessary to have sufficient instructions to shape a design upon, and here, as is natural, the custom varies with the peculiarities of each client. Many clients make a rough set of plans—usually defective. Others go even further, for I have had a model put into my hands as my instructions. Those who cannot draw, and some of those who can, wisely prepare only a list of what they require; availing themselves, probably, of some of the many published works on the subject. It requires much care to make such a list complete; when, however, it is complete, and a trustworthy series of sizes for principal rooms has been added, such a list forms a good basis for the architect.

In all probability the most satisfactory results are obtained by simply telling the architect what requirements it is wished to accommodate, and what special or unusual arrangements are required to be introduced, and giving him access to any model, either as to arrangement, size of rooms, or treatment which it is wished to follow; settling, in fact, the outlines of accommodation wanted in consultation with him, but leaving it very much to him to suggest how that accommodation shall be disposed. Thus, in a dwelling-house, the architect is best instructed by telling him how many members of the household, and how many guests are to be housed; what are the habits of the family; what existing rooms in known houses the new apartments ought to resemble in size, in shape, or style; and what house or houses (if there be such) the client looks upon as models in any special portion or throughout.

It is often the case that this part of the question is not easily disposed of. The architect's previous knowledge of the subject, the client's knowledge of what he requires, and the difficulties of site, frontage, and what not, under which he labours, are not the same in any two cases, and the trouble varies as they vary.

When, however, the subject is fairly grasped, the architect begins his design. Probably the mode of originating and elaborating an architectural design varies considerably, according to the habits and idiosyncrasy of each artist. I am inclined, however, to believe that, in most cases, a building is not first imagined as a building, but as a drawing—in fact, as a ground plan. Certainly the almost invariable custom is to commence upon the plan of the principal floor, and carry the arrangement of that on for some little way before touching any other part of the work. There will be ordinarily some simple germ, usually growing out of the arrangement of the communications between the best rooms, which will give the key-note, so to speak, of the whole. Such questions as the following are the ones which determine the lines of the skeleton of a plan:—Shall the building be symmetrical or irregular? Shall the rooms be entered from a hall or a corridor? In which direction will the offices, &c., lie best? From which side will the approach come? Where can the leading rooms be best placed for aspect, prospect, communications, and grouping? The chances are, that when these questions have been thought over for an hour, the true principle of arrangement, in order to combine them all, presents itself to the mind, and the key to the problem once found, the plan seems, in practised hands, almost to develop itself spontaneously.

From the first the designer ought to have present to his mind the possibility of forming a convenient series of upper rooms over those on his ground floor, the general nature of the roof which his ground plan will render necessary, and the leading masses externally and effects internally which his building will possess; and after he has gone some way with his ground plan he prepares plans of the upper floors, and elevations, or a prospective sketch of the exterior. This is all usually done to a small scale, and in many cases the drawings thus made have a very large amount of study devoted to them, and are altered and re-done very many times over, for in them lies the germ of the whole future work.

At length a series of fair sketches, embodying the main ideas of a design, has been prepared; and now, if not before, it usually becomes necessary to look into the question of cost.

In many cases the architect is furnished by *his client*, at the outset, with a statement of the sum to be laid out, as well as of the accommodation to be obtained, and it not unfrequently happens, by the bye, that the first is not adequate to secure the latter. It is, however, a more frequent case that, in the first instance, the accommodation desired is named, and the architect is requested in making his design to state its cost as nearly as he can. However this may be, it may be accepted as a general principle, that most of us when about to build, want more for our money than we can possibly get, and that, sooner or later, a conflict between cost and size has to be encountered. I, for one, always like to encounter it at the outset, and to endeavour to dispose of the question finally, although it is, undoubtedly, the most difficult part of our professional work to approximate, with anything like reliable accuracy, to the cost of a work for which nothing but the first sketches have been made, and perhaps hardly those completely.

The elements of this difficulty of estimating are twofold—first, the extremely wide range of costliness or cheapness possible to buildings of the same size and for the same purpose; secondly, the extraordinary discrepancies which the estimates for the same work will present, when a dozen men are all tendering for the execution of the building, and all of them men whose business it is to get their living by knowing what work will cost to execute.

It may be supposed that architects have, or ought to have, at their finger ends a series of trustworthy average prices; that it is familiarly known, for example, how much per bed a hospital ought to cost, how much per sitting a church, how much per room a dwelling-house, and how much per child a school. Again, it may be supposed that, bulk for bulk, one building will so closely resemble another that the price per cubic foot of bulk, or per superficial foot of area covered, can be guaged to a nicety; and it is quite true that such rough rules exist, and form the basis of our approximate estimates, but nothing short of very considerable tact, skill, experience, and adroitness in applying them to practice, will make them of any real value. It is a matter of simple counting to say how many rooms there are in a house, and of simple measuring to say what the cubic contents of a building, as shown on a set of plans, will be. It requires an amount of sagacity and experience not given to every one to say at what, of all the possible prices between eighty pounds and eight hundred, each room should be rated, or at what figure between fourpence and two shillings each cubic foot of contents should be priced. A simple illustration will show the truth of what I have been saying.

It is often urged that the difficulty of obtaining reliable preliminary information as to cost is greater than it ought to be, and perhaps it is so; but buildings are not the only articles of manufacture where prices range over a very wide margin. It appears to me that a house is a more complex thing than a black frock coat, or a wooden chest

of drawers four feet high; yet the price of a coat probably ranges from three pounds to ten guineas, and that of a chest of drawers from thirty shillings to twenty pounds; and no such extremes as are exhibited in these prices, or a hundred other familiar examples that I could name, are known in the building trade. In fact, it may be safely said that an approximate estimate of a building, prepared, with care and candour by an experienced estimator, is to the full as reliable a document as any of the ordinary bases upon which transactions are begun; while the building which is the subject of it is very widely open to variations in the course of its after-progress.

It is very important to the future success of the undertaking that the plans, made at this its early stage, should be understood by those who commission the building. To some a plan is an almost unintelligible document, and, in that case, some slight model ought to be constructed, to make arrangement, and even in some cases appearance, clear. With or without this aid, and with more or less trouble, the architect has now to see that his client fairly understands what he proposes, and fairly comprehends what he, the architect, judges will be the probable outlay. The amount of alteration which takes places at or about this stage of the work is often very great. In many cases the building has to be planned afresh, or re-arranged, or cut down, or enlarged, many times over, before a result considered satisfactory is obtained; in others, the design is accepted without modification. Sooner or later, however, the design is supposed to be in the main settled, and now commences the preparation of the definitive drawings.

In some rare cases, the drawings made to embody the idea of the design can be completed for the execution of the work. In the majority of instances this is impracticable, and an entirely new set of plans is prepared. These ordinarily go by the name of "contract drawings," as they form the basis of the agreement with the builder who executes the work. The favourite scale for these drawings is one-eighth of an inch to one foot, that is to say, the drawing is very nearly one-hundredth of the size of the actual work, and the drawings usually prepared to this scale are plans of the foundation, of each storey, and of the roof; geometrical elevations of each side of the work; and two or more sections, cut through the building from end to end and side to side, on arbitrary lines chosen so as to show those portions of the construction or arrangement which it is most important should be exhibited. These are followed by drawings on a larger scale; for the whole course of the development on paper of an architectural work consists in re-drawing again and again portions of it (or the whole), each time to a larger scale. Thus the contract or working plans, if to an "eighth" scale, as has been explained, are to a scale larger than (in fact the double of) the scale most frequently used for first sketches, and in their turn they are supplemented by drawings on a scale twice as large, namely, one quarter of an inch to a foot, showing in greater detail portions of the building; parts are again drawn out to scales of half an inch and one inch to the foot. Some details are then usually given to an eighth of full size, and the most important mouldings, enrichments, &c., are drawn full size. The set of contract drawings thus made by no means includes all the drawings necessary for the erection of the building, or even the larger number of them, but it contains all the most important general drawings, and sufficient details to enable a fair estimate to be formed of the work throughout.

The work to be gone through in the preparation of the set of contract drawings is arduous. They have often to be executed under pressure as to time, and yet they always ought to receive very full, careful attention, as in the preparation of them every point of importance, either in arrangement, construction, or treatment, ought to be anticipated and settled.

When the set of contract drawings is approaching completion, the architect has to prepare a document which accompanies them, and specifies the exact quality of material to be used, the precise mode of executing each portion of the work, and the thicknesses, weights, and other precise numerical definitions of every article open to doubt. This document is called a specification, and, in writing it the custom is to describe the materials and work under different trades, thus:—1. Excavator. 2. Bricklayer. 3. Mason. 4. Carpenter. 5. Slater. 6. Joiner. 7. Plasterer. 8. Plumber. 9. Smith and Ironmonger. 10. Painter. 11. Glazier. 12. Bellhanger. 13. Paperhanger.

The proper drawing of a specification is a work of labour amounting almost to drudgery, requiring great care, patience, precision, and acquaintance with work. The most essential points about it are, that nothing should be omitted, that nothing should be slurred over, or insufficiently described, and that the same amount of detail or compression should prevail throughout. It is of course a work in which system, amounting almost to routine, is essential, but, even with that assistance, the greatest vigilance is necessary to prevent omissions, however good the system may be. It is also customary to append to this specification a series of conditions, either those usual in building contracts, or such a modification of them as will suit the circumstances of the case. When these contract-plans and the specification are settled and near completion, it is not uncommon to make a second approximate estimate, and it is almost always worth while, for the basis of the estimate being in a much more complete state, it is possible to form a much more reliable calculation of the probable cost.

We have now reached the close of one complete phase of the architect's work, but one which has embraced really three distinct processes—the study of the subject, the general designing of the building, and the elaboration of the design in a practical shape. Let us for a moment review the nature of the work done thus far.

Of the architect's study of his subject, I said at the outset little, in fact, perhaps too little, as, in many cases, this is a severe labour, and if, in any individual instance, it is quite easy, the reason is *because the* architect has gone through the work of acquainting himself with the same subject on some previous occasion. In the example I have selected, that of a large dwelling-house, the habits of English families are so uniform, that an architect who has once mastered the subject may plan a house without much trouble, when he knows the size of the family and its customs. But in the case of each house-building architect there occurs a first good house, and, to prepare well for that, he requires to consider thoroughly the position and use of every room and every part of a room, from the drawing and dining-rooms to the oven, scullery, and brewhouse. There are, however, many architects, much engaged on public works, whose different buildings vary so much that each requires a separate investigation. For example, you can quite understand that there is little in common between a post-office, a hospital, a theatre, a palace, a court of law, a cathedral, a range of public offices, a fountain, a country house, a college, and a temporary exhibition building; yet in one architect's practice, with the work of which I am very familiar, the drawings for all these were going on within a space of about two years. It is manifest that each of these subjects must have required no small amount of special study, in order to produce a building thoroughly suited to the convenient discharge of the business to be carried on.

But, passing from the study of special subjects, a work which involves many visits to existing buildings of the same sort, I should like to return to a dwelling-house, and to touch upon a few of the points to be thought of in the planning of it and the working it out for execution. The relative position of each room in connection with all the others; the aspects of the windows; the communications, such as the hall, the corridors, and the stair-cases, require to be arranged for. Each room must be of the right size, shape, and disposition. In every main living-room the ordinary articles of furniture must be prepared for and places assigned them, and the same

in every bedroom, large or small. The position of window, door, and fireplace in each room, must be settled so as to avoid draughts, discomfort, and smoky chimneys. Light must be secured for every hole and corner all over the house, and so must ventilation. The service from the kitchen must be so provided as to bring the provisions into the dining-room readily, but to keep smells out. The duty of every servant, all over the house, must be understood, and all the endless appliances of a large house thought of. There must be a place found for the range and the hot-plate, and the jack, and the dresser, and the closets, and the shelves of the kitchen. The shelves, sinks and plate-racks, the coppers and washing-boards, the vegetable bins and the water supply of the scullery, must be all provided for. Care must be taken of the wine-cellar, the beer-cellar, the stores, the linen, the china, and the plate. Ovens, shelves, books, safes, plate closets, linen closets, housemaid's closets, baths, hot water, cold water, cupboards, lifts, and all manner of appliances are to be thought of; rooms for the family, and rooms for the guests; the nurseries, the upper-servants' rooms, the various services of butler, cook, housekeeper, footman, dairymaid, stillroom maid, must all be thought of, all planned for; all must be brought compactly together, and each must be kept out of the others' way. Whilst these matters are being disposed of, there are also many points in the structure that need attention in preparing working plans. Proper foundations must be provided for, and an equable distribution of the weights on the walls. The flues must be carried up into proper chimney stacks, the construction of bressummers, girders, floors, partitions, roofs, &c., must be devised. The arrangement of the roofing, so as to be easily freed from snow, the mode of bringing away rain-water, the drainage, the outfall or cesspool for the drains, the necessary precautions against damp, bad smells or tainted water, each and all of these must come under review, not one of them can be left to chance, any more than the putting together of the masonry or the brickwork, the thickness of walls, the quality of glass, or the weight of lead. All this time an entirely distinct set of considerations is also present to the architect's mind; his building is to please the eye, as well as accommodate the dwellers therein, and, whether there be the richest elaboration or the most rigid simplicity, he will not have fulfilled his duty to his employer, or been loyal to his art, if he has not striven to render the effect of his work, especially of the inside of his house, pleasing, harmonious, and appropriate.

I could go on further in this strain, reminding you that it is generally necessary to fix the nature of all the materials, the quarry—often the special bed for the stone—the quality of the bricks, and so on of every material throughout the structure; but I have said enough, I hope, to convince you that a vast amount of forethought and care is here wanted. I have only to repeat that all this has mostly to be done in a hurry, as few clients think of giving their instructions till that season of the year when the building ought to commence. Notwithstanding any hurry that may have existed, any error or oversight made at this period may probably—more probably than not—be a lasting injury and a cause of endless discontent, if not discovered in time for remedy in the course of the work; and even if it be so discovered and remedied in time, but at the expense of extra outlay, it will most likely be a source of grave complaint. I honestly confess that my wonder is not that oversights occur sometimes, but that they are so few and infrequent as they really are.

As the plans approach completion, the architect has to advise his client as to the means of executing the building. It is not very unusual for the proprietor to become, to some extent, his own builder, or at least brickmaker; time forbids our enlarging upon the work this entails on his professional adviser. The remaining courses are, either to agree with a contractor to execute the work at a schedule of prices, or to agree with a single contractor for a definite lump-sum, or else to invite several contractors to tender, and give the work to the lowest bidder. The plan of inviting contracts by public advertisement is, fortunately, seldom resorted to for private work; and the old plan of contracting with various tradesmen separately, though it still holds ground in the north, has been generally abandoned in the midland and southern counties. Whichever way is adopted, the architect has to negociate the business, and commonly, if there is a competition or a negociation with a single contractor, he has, from his knowledge of the trade, to nominate the contractor or contractors.

In any case where an estimate in a lump-sum has to be prepared, a more or less elaborate document, called a bill of quantities, is got out. This is sometimes prepared by the architect, but in and about London it is customary for a separate professional man, called a measuring surveyor, or quantities surveyor, to make it out. In either case, this bill is supposed to show with accuracy the whole amount of every description of labour, material, or article introduced into the building. In London these documents are prepared in the most extraordinarily elaborate detail, as their extreme length will abundantly show; in the country they are generally more condensed. A blank copy of this bill is furnished to the builder who estimates, or to each builder if there are more than one, and he puts his own price to the items, calculates the amounts, and bases the tender he sends in upon the result so obtained.

It sometimes happens that the estimate thus obtained is at once agreed to and accepted. At other times it is desired to reduce the amount of it, and in this latter case the architect has to arrange such variations or omissions as will admit of this being done.

Without further delay, however, we will suppose an agreement as to carrying on the work come to somehow, a contract signed, and a commencement about to be made. The architect has now, usually, to seek, and appoint, and engage for his employers a clerk of works, and to set out the building in its exact position on the site, and to fix some unmistakable level. This done, work is begun, and, from that time till the close of the operations, the architect has personally to visit the building, and has also to keep on continually preparing additional explanatory drawings, and, I might as well add, to furnish duplicates, sometimes triplicates of working drawings, for the use of the contractor and clerk of works.

The objects which the architect has to keep in view during the conduct of the works, and especially during his personal visits to them are, in the main, two—he has to satisfy himself, first, that the contractor and every man he employs are doing their duty; and, secondly, that the building will carry out his intentions and supply his client's wants.

To insure that the conduct of the work shall be satisfactory, it is necessary constantly to watch the materials and workmanship, either brought upon the ground, or introduced into the building, or in preparation at the workshops. I need hardly add, that to do this efficiently the architect must be a good judge of both work and material—an accomplishment requiring some amount of experience and attention. Where there is a disposition to evade the conditions of a contract, this part of the architect's work becomes both difficult and responsible, and at all times a certain amount of anxiety is involved in it. To a very large extent, however, the inspection of workmanship and materials can be facilitated by the clerk of works, if he be clever and honest. He is placed on the works on purpose to see, every day and every hour, that the contract is carefully and honestly executed, and I must say that I have, again and again, received the most valuable assistance in this branch of my duty from various clerks of works engaged under me.

In his other object, the architect has to bear in mind, during his superintendence of the work, that no one can be of much assistance to him. There is no part of his duty which he can less easily or less wisely delegate to

another, than that constant watchfulness which is imperatively needed to ensure the success of the building, both as a contrivance and a work of art.

Drawings, explanatory of the original plans and specifications, are continually in demand. The larger number of them, perhaps, relate to the artistic part of the work, and consist of full size profiles of mouldings and drawings of enrichments, or of details to a large scale, to show with precision and exactitude what is meant; but many structural drawings are wanted, and others are often called for to show modifications of the design; for there are few buildings in progress where some changes are not made. Sometimes a new want strikes the employer, or a new light dawns upon the architect. At other times an omission may be discovered, or an obvious improvement will suddenly present itself. At any rate, some alterations are usually called for, and require to be drawn out.

Constantly, also, during progress, specimens of moulded or enriched work, or full-sized models of features, are fixed in their intended place, and the architect has to visit the work, to satisfy himself that their effect will be as he wishes. In this way the superintendence of the work proceeds, and almost always involves some work for the pencil up to the very last, while the designing or the far less pleasant task of selecting chimney-pieces, stove-grates, fittings, paperhangings, and decorations, is as essential to the full success of the architect's work (and should be as fully left in his hands) as the design of masonry or joinery.

It may be asked whether the architect has any means of enforcing the execution of the contract, in conformity to his directions and wishes, and I reply that he has such means. The hold upon the contractor, which all building contracts give the architect, is the power of the purse. Buildings are always partially paid for as they go on, and always upon certificates from the architect. It becomes, therefore, part of the architect's duty to grant these certificates, and, in giving them, he has to see that the amount certified represents the proper proportion and no more of the contract price, and that the work is properly done; for it is his duty to withhold his certificate if his complaints remain unattended to, or his orders are not complied with. In cases of work by a schedule of prices, very careful measurements are made from time to time; and, when the work is done in other ways, suitable valuations are made; but, in some shape or other, the architect requires to be armed with the only power which will effectually enable him to protect his employer and secure attention—that of controlling the cash payments.

When, at last, the work is completed, it becomes the architect's duty to make up a statement of accounts. All claims for extra or additional works are checked and measured by him, or by the measuring surveyor for him, and the counter claims arising from the omission of work included in the contract, but not carried out, are valued. A balance is struck after every item has been scrupulously examined, and, if necessary, fought over. And the architect's last duty is the signing a final certificate that the balance, whatever it may be, is payable to the contractor.

I have now, I think, gone through the most salient points of an architect's ordinary duties, such as they exist when there are no accidents or bankruptcies, and no disputes, difficulties, obstacles, or other hindrances of any special magnitude; and, with the hint that such difficulties do not unfrequently arise, and impose on the architect different duties, sometimes as a negotiator, at other times as an advocate, or again as an arbitrator, I might, I think, leave the subject. Yet, if you will bear with me a moment or two longer, and not think my tale a fable because I try to point it with a moral, I have something to add.

Perhaps the most obvious sequel to all that I have said is the inquiry, "If all this is needed for the success of a building, who furnishes a sufficient amount of care when there is no architect?" The reply is, that most of it is not furnished, and the building suffers; and, as to the remainder, either some skilled or experienced assistance must be employed, or else other work properly designed is copied, and thus a portion of that thought, without which a building cannot be built, is secured; and, lastly, that much of the time of skilled artisans is spent, where there are no regular plans and no skilled direction, in furnishing, imperfectly and piecemeal, substitutes for that which ought to be clearly arranged and laid down for the workman by the architect.

If I have said enough to dissuade any person from becoming his own architect, this paper will not have been without service. Though there is no mystery in the planning and direction of work, yet this requires a very large amount of knowledge and familiarity with the subject; and, though an individual who desires to build, can, if he please, employ any number of men, and gain a good deal of experience in rectifying their mistakes, such experience is dearly bought, and comes too late for its purpose.

I have throughout studiously avoided giving prominence to the art side of this question; but here at least I must say that, however skilled a draughtsman or even a designer any private individual may be, he will be sure to be deficient in that technical knowledge which inspires the architectural treatment that a building receives from a good architect; here, at the best, defects are, to my mind, inevitable in the work of every man who has not measured and drawn much existing architecture.

Few persons readily understand that, because architecture deals with things quite familiar in one aspect of them to those who live in buildings, or buy or sell them, it is yet necessary to have long practice, in order to combine with economy and judgment the different parts of a room, and the different rooms of a house; and to provide a place for all that has to be included within its four walls. Almost as few recognise the fact that if they can draw an architectural feature when they see it, that power is quite different from that of the architect who has to draw a whole building and its parts as he imagines them, and then to furnish for every portion the profiles of the mouldings, the sizes of the panels, the treatment of the carving to a large size. As a simple instance, it is easy for any person to draw a window with mullions, but no one who has not studied as well as sketched will be able to settle whether the width of the mullions should be a fourth, or fifth, or sixth, or what proportion of that of the adjacent light. The difference between a narrow and a wide mullion is equivalent to a total difference of style; a mullion of five inches would be out of place if one of seven inches was correct, and when it was done, the amateur would see that something was wrong, but would not know what; and it is to attain the power of regulating the half-inches in cases like this, that the student of architecture has to wander for months, or even years, through the districts where good buildings exist, making notes and drawings; and, let me add, there is nothing short of a perfect knowledge of these details, and incessant attention to them, which can give harmony, unity, and character to a building.

It may be natural, and I hope is not out of place to add, that the architect who does these services thoroughly has fully added the value of his fees to the value of the building. That he has quite work enough to do in earning them will be apparent to any one who turns over the plans and specifications of a large work, and forms some idea of the additional time spent in superintendence. I trust you may be willing to believe that the client has value received in the building for what he pays. The architect's remuneration, in ordinary cases, is, customarily and legally, a commission at the rate of five per cent. upon the cost of the works. This pays him very unequally, in some cases being sufficient, in others not so; but I believe it is a very fair way of payment as far as the employer is concerned, for it represents an increased standard of excellence throughout the building as com-

pared with what, under the most favourable circumstances, might have been reached without the architect, and this increased excellence is really an increased money value.

In concluding, I should like to say a word as to some peculiar demands made sometimes upon an architect's skill, and to point out what he ordinarily cannot and does not do. No architect can make a bad builder do good work. He can make all sorts of agreements and stipulations that the work shall be good, and can try very hard to enforce them, but there is a certain proverb about silk purses and the materials suited for their manufacture which will help to illustrate the impossibility of success. It is as well to add, that the architect can materially help to secure a good builder, and that he can generally prevent a good builder from doing bad work.

The architect cannot, from the very fact that he is human, ensure perfection in every part of the work, but if he is able and careful his services carry the building a great deal further towards excellence than is often imagined, and though no amount of care makes it quite certain that every flue shall draw, and every lock shall work, that the arrangement shall be all that can be desired, and the effect please everybody, yet a skilled architect, working for a good client, will go a very long way towards this result.

The architect is not ordinarily called, as the engineer is, to calculate accurately the endurance of his materials, because his walls ordinarily must be thicker than the weights on them demand to keep out the weather, and his joists must be stiffer than is needed to support the floor, in order to prevent the ceilings from cracking, and so throughout; but he has a great deal of that sort of calculation, in which tables and to perform experiments can but imperfectly guide him. He has to judge of foundations, and the balance of weights in his structure; of the sufficiency of windows and passages; of the probable effect on the eye of features not yet commenced; and of the suitability and durability of materials. Lastly, he has often greater difficulty in the management of men than of works, and the cross-purposes at which clients, builders, landowners, clerks of the works, foremen, and tradesmen are sometimes playing, often give him enough to do in his character of negotiator. Here, however, I do not propose to follow him. I have purposely kept out of sight much of what the architect has to do as an Artist. I shall certainly not be expected—if I say so little as to a side of his employment which ever demands his constant attention—to add anything as to other classes of duties or difficulties which are uncertain and irregular in their occurrence. I, therefore, here leave the subject, trusting that my paper may be judged to have furnished a fair account, and nothing beyond a fair account, of the nature of the ordinary and routine occupations of those professional men to whom you are in the habit of entrusting the design and superintendence of the buildings you erect.

DISCUSSION.

The Chairman said the paper was eminently practical in all its bearings, and, no doubt, would be well discussed by some of the gentlemen present, amongst whom he saw several who were especially acquainted with the matter treated, as, for instance, Professor Kerr, who had written what was quite the text-book on the subject which had been brought before them—"The English Gentleman's House." He could hardly do better than call upon this gentleman to open the discussion.

Professor Kerr said he had listened with great satisfaction to the paper which had been read by Mr. Roger Smith, who always discussed his subject, whatever it was, in both an agreeable and sensible manner. The impression left upon his mind was that it was a most unwise thing to be one's own architect; he did not know whether the main intention of the writer was to impress this upon the public mind, but he had certainly mentioned a list of dangers to be apprehended from the non-employment of an architect enough to frighten any one. The typical English gentleman, however, was usually determined to act as his own architect as far as he could, as he believed he knew his own requirements much better than any one else, and he (Professor Kerr) believed it to be the professional architect's duty to carry out his clients' wishes to the best of his ability. He looked upon the architect as a practical man, and not at all as a sentimental person; his sentimental days were gone long ago, and he hoped they would never return. The architect was the servant of the public, employed for the purpose of doing that which they were not able thoroughly to do for themselves, viz., to design and scientifically arrange a building, so that it should be perfect in all its parts, so that all the refinements of the age might be duly provided for. When this was properly done he considered that a great deal more than 5 per cent. additional value was conferred upon the building. If *the architect* were an unskilful man, which might sometimes happen, the case was different; but he was glad to say, for the credit of the profession in England at the present moment, that he knew of no profession in which there were fewer incompetent men, or where a man did more work for less money. Under these circumstances he fully appreciated the effort which Mr. Smith had made to impress upon his audience the importance of the architect's functions. With regard to the degree in which the owner of a house might be allowed to exercise his own fancy in the design, his (Professor Kerr's) opinion was that an intelligent client was entitled, within the limits which no English gentleman was likely to transgress, to dictate to his architect the conditions under which he chose to live; and a skilful architect would fulfil these conditions as perfectly as possible. He was bound to say that he had had clients whose assistance had been of the greatest possible service, and he knew of no greater gratification on the part of a professional man than to feel that he had honestly fulfilled the wishes of his client, and that by the exercise of his own skill he had accomplished that which a less careful man would have pooh-poohed as an impossibility. Mr. Roger Smith, he was glad to see, had not followed the general rule according to which architects were spoken of in England; their functions were generally divided into practical and artistic, the latter being considered by far the most important. This he considered a great mistake. He believed that it was, generally speaking, the truth that an architect, at any rate in his calmer moods, considered himself simply as the servant of the public, and it was a mistake to suppose that he wished to force his own principles of treatment on the public against their wish. That which had led architects to produce public buildings which had ultimately gone out of fashion, to say nothing more, was the pressure put upon them by *dilettanti* and others, who, with the best intentions, were not always possessed of that information which enabled them to give judicious advice. If architects, as a body, were more consulted on questions of public architectural art, architecture would not become more outrageous than it had been, but less so. Unless architects were encouraged in the other direction, he believed they would be induced to follow the dictates of common sense, and to remember that after all the English character was averse to any excess of display, either in ornament or anything else, and that the first condition of a good building should be that it fulfilled all its internal functions thoroughly and completely, and that any elaborate ornamentation was altogether a secondary consideration.

Mr. Benjamin Ferrey thought Mr. Roger Smith was deserving of the best thanks of the meeting for the very able and interesting paper which he had read. He quite agreed with all that had been said, both in the paper itself and by Professor Kerr, and would simply move a cordial vote of thanks to Mr. Roger Smith for his valuable paper.

Mr. C. F. HAYWARD had much pleasure in seconding the vote of thanks, which was due to Mr. Smith not only from the public, but from his professional brethren, who were peculiarly interested in the subject brought before the meeting, and who, he believed, would generally be found ready to endorse everything which had been advanced. For his own part, although he quite saw the wisdom of the course which had been adopted, he could not help regretting that the artistic portion of the subject had not been more touched upon. He could not at all agree with Professor Kerr that the time was gone by for sentiment with regard to architecture, and he should much regret if sentiment were entirely to leave him when designing a building. When troubles came, as they would come—troubles connected with contracts, with workmen, with clients, or with other professional matters—he could not help feeling that it would be a most disagreeable task to go on with the building if there were no sentiment connected with it. He would put it to any gentleman present not connected with the profession, if it would be possible to build a granary or factory in the same spirit as such a building as had been brought under their notice in the paper, a gentleman's country house. He must say that, independently of any question of remuneration, it was a great pleasure to an architect to build a good house for a good client, and he believed that was one of the reasons why an English country gentleman was so anxious to interfere with the arrangements of his building; he felt the influence of sentiment, and desired for the time being to be himself an architect, and could scarcely refrain from interfering, although he might know that he would do so to his own cost. He (Mr. Hayward) had always felt the greatest pleasure in conferring with his clients upon points in which their own feelings were concerned, and where no questions were raised as to the builder's work or other matters of dry detail, which, albeit very necessary to be gone into, were very disagreeable both to the client and to the architect. It must have been a great pleasure to Mr. Roger Smith to carry out such a building as was represented in various details on the walls around them. It would be evident to anyone that, whatever an architect was, he was a working man; and that in the present day was a very honourable term. Even if his own hands took no part in the work, still his mind and brain must be constantly on the stretch until the building was finished. Mr. Roger Smith spoke of an architect designing or superintending the furnishing of a house as well as the house itself, and this he looked upon as a most important matter. Some clients would trust an architect with the carrying out of a building from the foundation to the chimney top, and yet would not take his opinion with regard to the design of a stove or a chimney-piece, and certainly not on the question of a paper hanging. This was a point which, in his opinion, ought to be more insisted upon as connected with the duties of an architect. As he understood it, an architect's duty was to carry out a building until it was externally and internally complete, and this could not be the case unless everything connected with it were under his immediate superintendence. He had great pleasure in seconding the vote of thanks.

Mr. CHATFIELD CLARKE had also much pleasure in supporting the vote. He was sure there were several points which must at once impress the mind of any one who contemplated building. The first was, that he should employ an honest and capable architect; and the second, that, having done so, he should give him his full confidence; and this latter point was, in his opinion, one of the principal requisites to success in any building. The next point was to secure an honest and able contractor, for, as had been said, however desirous an architect might be of producing a good building, he could not do so if the builder were a determined rogue; and the result of his own experience was the same as that of Mr. Roger Smith, that, however careful they might be, they could not make a bad builder do good work. Another point, which he considered of some moment, was, that when once a building had been planned it should be altered as little as possible. A building was a conception as a whole, and, to a certain extent, might be considered as an inspiration, and therefore any subsequent piecemeal alteration very often interfered with the general effect of the structure. In conclusion, he would remark that building a house in the country was a very easy matter indeed compared with building in London. Very recently, in erecting quite a small building, which was not to cost more than £5,000, he had had eight or ten different negotiations on the subject of party walls, the rights of adjacent lights, difficulties connected with the Metropolitan Building Act, lines of frontage, and so on. Questions of lights and other matters were now refined upon to such an unnecessary and vexatious extent, that he believed it would be well if professional men were to take some means of calling public attention to the difficulties thus thrown in their way. He thought the manifest conclusion to be drawn from all that had been said was, that no wise man would enter on building operations of any extent without the assistance of a competent architect.

Mr. J. C. WILSON said there were a few questions which he should like to ask, not being a member of the profession. Did architects generally approve of deafening the floors of houses, as was frequently done in Scotland, by introducing a mixture of lime and ashes, which was found to keep the rooms warm in winter and cool in summer. Again, did they approve of making flues of a taper shape? he believed such a method would greatly tend to prevent chimneys from smoking. He should also like to know if architects approved of making a separate flue for ventilating purposes from each room to the roof the house. He was not sure whether or not it was the practice amongst architects, when serving their apprenticeship, to learn the various trades connected with building, such as joinery, masonry, and so on. This course was adopted by engineers, and he believed with very great advantage, as it gave them a knowledge of materials and construction which they could hardly obtain in any other way. He also begged leave to throw out the suggestion whether it would be possible to build houses according to certain classes, and have them classed much in the same way as ships were classed at Lloyds', having regard simply to the quality of materials employed and the workmanship, so that the purchaser of a house which had been built and certified, say by the Institute of Architects, as belonging to a certain class, would know that he was buying something of a certain marketable value. Of course no house would be classed at all which had not been built under the superintendence of a professional man. Whatever the public might think of the value of an architect's services, the members of the kindred profession were quite aware of the great ability and talent which were required to make a man a good architect, and he hoped the day was not far distant when the two professions would be found going more hand in hand than they had hitherto done, the architect doing that portion of an engineer's work which properly belonged to him, and the engineer, on the other hand, assisting the architect in all purely engineering matters.

Mr. BISHOP said that last summer he had a house built, the bills of quantities being got out by a surveyor from the architect's specification, and upon these quantities builders were invited to tender. He went through some of the details himself, and he found, to his astonishment, that on the average the results were 33 per cent. in excess. The consequence was that he had to call upon the different parties who were tendering, and explain the matter to them, and one contractor, who had made out his estimate, was able to reduce it by £400, which was about 33 per cent. of the total.

Mr. JONES remarked that, having heard what was the amount of remuneration which architects received, he should be much obliged if Mr. Smith could inform him what amount of consideration would secure honesty in a

clerk of works. It was quite possible for him to have a commission on both sides, whereas, unless he were quite loyal to the person building, there was every probability of the structure being defective. It was one of the greatest evils in the present day that so few workmen could be trusted, so that a man, unless he could do a thing himself, never had any certainty that it would be done honestly and properly according to his expectations. Mr. Smith had spoken of being able to secure honest and able men as clerks of works, and perhaps his experience might be available to others.

Mr. Edwin Nash said all architects knew the difficulty of obtaining good clerks of works, and very often they were glad to have a building erected without such assistance, feeling that they could trust much better to the builder himself. A good clerk of the works was a most valuable man, but though there were some of that class, unfortunately there were a good many of the other; and being generally drawn from the ranks of workmen, it could not be expected that they would always be all that was desired. Some questions which had been asked could be answered far better by Mr. Roger Smith than by himself, but others were very simple. Architects did not object to deafening floors, which were very often treated in a similar manner to that described, nor did they object to taper chimnies, except as a question of expense, and some little arrangement being required in the management of the brickwork. The effect in the way of preventing smoky chimnies had not been much tried, but he believed it would be found beneficial, although of course there were objections; as for instance, such chimnies would be much more exposed to the weather than those of one calibre throughout. One matter which had not been touched upon he considered of great importance in connection with the architect's duties; he was too much harassed with practical office work of a dry technical character. This could not have been the case with Michael Angelo, Raffaelle, or the other great masters of former periods, or they never could have designed and carried out their magnificent works. He considered that architects ought to be far more of artists than they were, and unless a large amount of their dry business work were transferred to some one else, he thought English architects would never rise to the high standard of excellence which had been seen in former days.

Mr. Hyde Clarke said it had been hinted to him that the audience was to a great extent a professional one, and that the discussion had been principally carried on by architects, but as an old member of the Society of Arts he might remark that the subject came strictly within their domain as a technological one, and one of very great importance to the public. The point of view from which Mr. Roger Smith had treated it was eminently practical, for everyone was, in some degree, interested in the building of a house, which could not be said to the same extent with regard to building on a large scale, although on that also there was a bond of union between architects and an educated public, the community of enjoyment in works of art. Unfortunately architects were too often neglected in such matters as house building, and he regretted that a greater number of what might be called the employers of architects were not present, to see, from the drawings which surrounded the room, the great quantity of work which an architect had to perform. The interesting paper which had been read showed the relations between the architect and employer, and pointed out to the latter the real value of the services rendered by that profession. If this were more generally known, he believed there would be a much better understanding between architects and the public. In every business but that of building the value of ability and directing power seemed to be understood. Even in a tailor's shop this was the case, but people were much fonder of having their houses from a "slop-shop" than their clothes; they were not always in the habit of having them made to fit, and yet every one knew that even in the matter of a coat, a considerable amount of ability was required in order to ensure a successful result. On the whole, he did not know that there was much cause for regret that there were so many professional men present, because the discussion had shown that Mr. Roger Smith had the concurrence and support of his professional brethren in what he had advanced.

Mr. Ladd, as a professional man, felt much obliged to Mr. Roger Smith for the manner in which he had presented his drawings to their notice. These plans showed the amount of work which had to be got through, and when it was done in so complete and detailed a manner, he did not consider that the five per cent. was at all an adequate remuneration; these drawings set a good example to any young architects or pupils who might be present, and showed them how their duty should be fulfilled in carrying out any work which was placed in their hands. Very often, he was afraid, not one-fourth of the drawings —in proportion to the extent of the work—were made which were here shown, and in those cases probably five per cent. was enough. First-class architects, of course, would do their work thoroughly and well, and in such cases they were not over but under paid. In his opinion there should be different scales of remuneration according to the amount of detail in the building, which involved extra work on the part of an architect.

Mr. Tracy asked if there were any intelligible rule known to architects by which they constructed a house, for, according to his experience, smoky chimneys were the rule in dwellings of all classes, both those on which unlimited expense was lavished, as well as those built in the cheapest possible manner.

Mr. Roger Smith, having thanked the meeting for the kind reception which his paper had received, said that notwithstanding the remarks of the last speaker, architects had a certain amount of knowledge with regard to the building of chimnies, and when they were carefully constructed on principles which were generally understood, they were not often complained of. It must be remembered, however, that it was a very delicate matter to arrange for a column of hot air to ascend, in all weathers and under all circumstances, so that it should never be liable to disturbance either by the opening or shutting of doors, by the starting of similar currents in other parts of the house, or by changes in the condition of the atmosphere inside or outside the building; still he was quite ready to admit that a good deal might yet be learned on the subject of flues. It was a very common practice to deafen the floors in good houses, but he knew nothing about taper chimnies, and should not like to take the responsibility of advising their introduction. Distinct ventilating flues were very desirable where expense was not an object, provided they were constructed upon an intelligible system. It was not usual for architects to go through any large series of workshops, but they not unfrequently spent some time in a joiner's shop, which was, no doubt, of considerable advantage. It would not be very easy to devise a classification for houses, and if it were done he did not think it would be of any practical value. One of the most important points in the discussion was that raised by Professor Kerr, as to the share which the proprietor himself might take in the erection of a building. What he had said in the paper referred rather to a man acting as his own architect, *which he did not* deem by any means desirable; but, for his own part, the greater share his client took in the building the better he was pleased, not that the result was always better, but that so much responsibility was taken from his shoulders. He perfectly agreed that a client had a right to dictate his conditions, and it was the business of the architect to carry them out in the best way possible. He believed the best results were attained where the client contented himself with stating his conditions, and left to the professional man the carrying of them out. The whole question was complicated to some extent by a house being so familiar

an object, and the furniture even more so. From this cause, probably, it was that an architect was so rarely allowed to give any opinion as to furniture, or even what were really parts of the house, such as chimney-pieces and wall papers. His own idea was that a man who wanted to make the most of his architect would use his skill and experience to the utmost, considering that he knew more than he himself did. Occasionally there were instances in which the client might detect matters which had escaped the attention of the architect, but, as a rule, it was the other way. Some of his brethren had rather complained of his not having said more of the artistic part of an architect's work, but the fact was he had been cautioned not to go into that matter, but to deal with the subject from a technological point of view, as being more specially fitted for discussion in that room. The truth was, considerations of artistic excellence and beauty never ought to be absent from the mind of an architect, whose loyalty to his profession should make him endeavour to make the plainest and simplest building conform to the true principles of art. He could not agree with what Mr. Chatfield Clarke had said about the alteration of plans when once made; but that was simply an instance of the different way in which different minds worked, and probably it would be found that no two men arrived at the same end by the same road. He could not go into the question raised by Mr. Bishop as to the quantities without having all the particulars, but the remarks of Mr. Jones as to clerks of works were most important. No sum of money would purchase honesty in such functionaries, but at the same time he had had many and had never had a thoroughly bad one. He always regarded it as one of the most important points to secure excellence in a clerk of works, and spared no pains, therefore, to ascertain what was his previous character. He begged to thank Mr. Hyde Clarke for his remarks; and though he did not think he was correct in saying that the audience was mainly a professional one, still there were architects enough present to secure the correction of any serious error he might have made in his paper. As to the point raised by Mr. Ladd, that an architect who did his work well was underpaid, he had stated something very similar in the paper, but, at the same time, the 5 per cent. commission was now well established, and, on the whole, did not cause dissatisfaction, although there might be individual cases of hardship.

The Chairman said he could not help feeling that the duties which an architect was called upon to render to his client had been, if anything, rather understated in the excellent paper of Mr. Roger Smith. One particular duty which had not been insisted on, but which was of great importance, was that of exercising patience. There were moments of difficulty in the progress of almost every great work, when an immense deal of tact and patience was necessary sometimes even to keep the peace between half-a-dozen people, and to make things go on smoothly, and this was worth at least one out of the 5 per cent. Another essential qualification was a combination of unselfishness and friendliness. An architect, in the early stages of his intercourse with his client, could very frequently be of the greatest possible service, sometimes by telling a man that he must spend more money, and sometimes that he should spend less. It was important early in the negotiations to see what was the tendency of the client. Sometimes he might be a man with a great taste for art, but with limited means or heavy family claims, and if in a moment of selfishness an architect took advantage of that enthusiasm, and went on glorifying himself at his client's expense, he did that which was improper and reprehensible, Again, the relations between the architect and his client being reciprocal, it was his bounden duty to act as a friend to his employer throughout, and from the moment that was clearly understood all mistrust would be removed, and the happiest relations would be established. Another quality which the architect should possess was that of justice. It was necessary for the protection of the employer that contracts should be in very strict terms; and where the former was of a grasping disposition, the builder was often so much at his mercy, that unless the architect held a very fair hand between the two, great injustice might be committed. He should, therefore, strive, above all things, to earn in all his transactions a character for uprightness, taking care, on the one hand, to protect his client, but never allowing injustice to be done to the builder. In conclusion, he begged, on behalf of the meeting, to tender to Mr. Smith a cordial vote of thanks for the very excellent paper he had read.

The paper was illustrated by a complete set of designs and working drawings for a country house, which nearly covered the walls of the room.

THE SITE FOR THE LAW COURTS.

In the House of Commons, on Tuesday last,

Mr. Gregory asked the First Commissioner of Works whether the Government had decided finally on the site for the new law courts suggested in his speech on Tuesday, the 20th, by the Chancellor of the Exchequer; and, if so, whether the proposed site could be acquired without delay; and in what manner, and how soon, would the subject be again brought before the House of Commons. Perhaps the right honourable gentleman would be able to state the precise spot mentioned by the Chancellor of the Exchequer as a desirable site for the new law courts.

Mr. Layard—In answer to the question of my hon. friend, I beg to state that the Government have finally decided to propose to the House a plan for the erection of the new law courts, on the site mentioned by my right friend the Chancellor of the Exchequer, on Tuesday last. As much apprehension appears to exist in the House and out of doors, as to the nature of the scheme suggested by my right hon. friend, I may take this opportunity of stating that the site proposed to be acquired by the Government is that comprised between Somerset-house and the Temple, bounded on the south by the Thames Embankment, and on the north by Howard-street, and several small alleys and passages connecting that street with the Temple and King's College. This site will furnish six acres of building ground. Mr. Street, who is now occupied in adapting the plans which he has already prepared for the Carey-street site to this new site, informs me that he will be able to erect all the law courts, and every office necessarily dependent thereon, upon these six acres. It is my intention to introduce very shortly—if possible, before Whitsuntide—a Bill which, should the House think fit to pass it, would enable the Government to proceed without delay to acquire the proposed site, and to commence the erection of the law courts upon it. I shall be prepared, on the introduction of that Bill, to give a full explanation to the House of the plan contemplated by the Government, and to point out its great advantages over all other plans hitherto suggested. At the same time I shall be able to give such assurances to the House as will, I hope, convince them that it may be carried out, including numerous and most convenient approaches, for the sum mentioned by my right hon. friend, viz., £1,600,000, or at a much less cost than any other scheme. Mr. Street is now preparing detailed plans, which I shall be able to submit to the House before the second reading of the Bill. Before sitting down, I may state to the House, what I had not the opportunity of stating the other evening, that I have received a communication from the Chief Baron of the Exchequer, Sir Fitzroy Kelly, stating that he and all the Judges with whom he has communicated, except one, are of opinion that, upon every ground, as regards the Bench, the Bar, the solicitors, the suitors, and the public—I quote his own words—the Thames Embankment should be preferred for the site of the law courts.

Mr. Hunt asked what was to be done with the Carey-

street site, and whether notice had been given to those persons whose property would be required for the new site.

Mr. Layard promised to explain this when introducing the Bill.

Lord. J. Manners hoped full opportunity would be given for discussing the Bill.

Mr. Layard said he had reason to believe it would be a public Bill, and therefore every opportunity would be given for discussing it.

Fine Arts.

DISTRIBUTION OF WORKS OF ART BELONGING TO THE STATE IN FRANCE.

A decree has just been issued relative to the distribution of such works of art as are not required for the Galleries of the Louvre, accompanied by reports from the Minister of the Beaux Arts, and the Superintendent of the Beaux Arts, Comte de Nieuwerkerke.

The number of pictures and other works of art laid up in the store-rooms of the Louvre, for want of hanging space, has always been a cause of complaint, and although the exhibition space has been greatly increased of late years, the acquisitions are so numerous, that the hidden stores are little if at all diminished, and the Government has felt it necessary to devise some additional means of making use of its surplus treasures.

It appears that during the last fifteen years the artistic collections of the Louvre have been increased by no less than forty-five thousand objects of art, pictures, sculptures, antiquities, &c. The question therefore arises whether all these treasures are to remain in the possession of the state, or whether a portion of them may be more profitably employed in cultivating the taste and aiding the artistic education of the people of France.

Now that the enlargement and restorations of the Louvre are all but completed, the exact capacity of that immense establishment is exactly ascertained, and consists of 142 galleries, or rooms; but large as is the space thus provided, it is not sufficient to contain, or at least to exhibit, the whole of the works in its possession. The imperial palaces are also well provided with works of art. There remains, according to the view of the Ministry, but one legitimate application for the superfluities of the Louvre, which is, to distribute them amongst the churches of the country, and the museums and galleries of those towns which have made laudable efforts either to establish new collections of works or to enrich those already in their possession, and have thus given a great stimulus to the love and study of art in their several localities. That this effect has been produced is proved by the great increase and improvement in the exhibitions which are now so numerous and important in provincial towns.

At present the Government has not the power to alienate any of the property of the state, and therefore a proposition will be laid before the Senate, authorising a certain number of items to be struck out of the inventories of the collections appertaining to the Crown, in order that they may be distributed in the departments as proposed.

The selection of the objects to be retained in the Louvre, or otherwise disposed of, is, of course, an operation of great trust and delicacy, and it has therefore been decided that lists shall be drawn up by the directors of the public galleries, and submitted to a special commission, consisting of the superintendent of the Beaux Arts, as president, and twelve members, six to be chosen from amongst the officers of the state and the rest from the Academy of the Beaux Arts.

In accordance with the recommendations of the minister a decree has been issued, the chief article of which is as follows:—"A statement shall be drawn up, by the authorities of the imperial museums, of the pictures and objects of art belonging to the crown which can be spared without inconvenience, and delivered over to the State." The works thus withdrawn from the imperial museums, and distributed in the provinces, will thus cease to be the property of the state, although, possibly, the recipients may be bound *in certain conditions* with respect to them, but *nothing* of this kind appears in the decree.

The Commission appointed by the same decree to carry out the object in view consists of the following members:—

Le Comte Nieuwerkerke, President; M. Chaix d'Est-Ange, Secretary of the Senate; M. Merimée, Senator, and Member of the French Academy; M. Alfred Le Roux, Vice-President of the Corps Legislatif; Le Comte Welles de la Vallette, Deputy; and Le Vicomte de Rouge, Councillor of State.

MM. Cabanel, Gérôme, Le Vicomte H. Delaborde, Gatteaux, Guillaume, and Cavelier—Members of the Academy of the Beaux Arts.

The Chartres Exhibition.—The town of Chartres has voted the sum of £200 for the purchase of pictures at the forthcoming exhibition, which opens there on the 1st May, at the same time as the regional agricultural exhibition. It is announced that the Empress, and probably also the Emperor, will pay the town a visit on the occasion of its combined exhibitions of industry, art, and archæology.

Notes.

Australian Meat.—The Lords of the Admiralty have accepted the tender of the Australian Meat Company (Limited), for whom Messrs. John M'Call and Co. are the London agents, for the supply of 200,000 lbs. of Australian preserved beef.

Exhibitions at Beauvais.—The coming exhibitions at Beauvais, which open on the 1st of June, are likely to attract a good many English visitors, from the nearness of the town to the British Channel, and other circumstances. The occasion is the agricultural show of the eight northern departments of France, which presents special interest to English farmers and others from the similarity of soil and products with our own country, the beet-root cultivation at the present moment, furnishing an interesting object of study. The additional exhibition comprises six groups—the fine arts and application of the liberal arts; furniture, tissues, clothing, &c.; products of extractive industry, raw and manufactured; machinery and processes of the useful arts; agricultural buildings and products; and horticulture. A large building has been erected for the purpose, with a spacious garden for out-door exhibition. In the centre of the building will be a large covered space for large hothouse plants; and a special gallery is set apart for fine and retrospective art. Steam and water power are provided for machinery in motion. One new feature deserves notice; the chief prizes will consist of works of art, one in each group, and the others of medals.

MEETINGS FOR THE ENSUING WEEK.

Mon.....Society of Arts, 8. Cantor Lecture. *Mr. John Anderson*, "On Applied Mechanics in relation to Natural Power."
Social Science Assoc., 8. Mr. S. H. Gael, "On Life Peerages."
Royal Inst., 2. General Monthly Meeting.
Society of Engineers, 7½. Mr. Wm. Sugg, "The Systems and Apparatus employed for Illumination by Coal Gas."
R. United Service Inst., 8½. Mr. Charles W. Eddy, "A Movable Steel Mantelet for the Protection of Field Artillery and Troops."
Entomological, 7.
British Architects, 8. Annual Meeting.
Medical, 8.
Asiatic, 3.
Victoria Inst., 8.

TUES ...Royal Inst., 3. Prof. Grant, "Stellar Astronomy."
Pathological, 8.
Civil Engineers, 8. Discussion "On the Outfall of the River Humber;" and (time permitting) Mr. J. Ellacott, "Description of the Low-water Basin at Birkenhead."
Anthropological, 8.
Syro-Egyptian, 7½. Rev. G. Sandie, "On the Peninsula of Sinai."

WED ...Society of Arts, 8. Col. F. C. Maude, C.B., "On the Formation of Industrial Settlements in our Colonies."
R. Society of Literature, 4¼.
Archæological Assoc., 8.

THUR ...Antiquaries, 8½.
Linnæan, 8.
Chemical, 8.
Artists and Amateurs, 8.
Royal Inst., 3. Prof. Tyndall, "On Light."
Society of Fine Arts, 8. Mr. S. C. Hall, "Memories of the Men and Women of the Age."

FRI .....Society of Arts. Piscicultural Committee. Mr. A. F. Pennell, "On Oyster Culture and Legislation."
Geologists' Assoc., 8.
Philological, 8¼.
Royal Inst., 8. Captain Moncrieff, "Moncrieff System of Working Artillery."
R. United Service Inst., 3. Mr. Robert H. Scott, "Storms on the British Coasts, and Telegraph Weather Intelligence."
Archæological Inst., 4.

SAT .....R. Botanic, 3½.
Royal Inst., 3. Prof. Seeley, "Roman History.

PARLIAMENTARY REPORTS.

SESSIONAL PRINTED PAPERS.

Par. Numb.

Delivered on 21st April, 1869.

143. Post-office Savings Banks—Account.
148. Public Income and Expenditure—Account (year ended 31st March, 1869).
Public Petitions—Fourteenth Report.

Delivered on 22nd April, 1869.

75. Bill—County Coroners.
86. ,, Court of Common Pleas (County Palatine of Lancaster) —Amended.
124. Parishes—Return.
138. Patents for Inventions—Returns.
Judicature Commission—First Report of the Commissioners.

Delivered on 23rd April, 1869.

87. Bill—Local Officers Superannuation (Ireland).
88. ,, Naval Stores.
89. ,, Governor-General of India.
2. (6) Railways Abandonment—Warrant of the Board of Trade.
97. Poor-law Unions—Return.
118. Treasury Chest—Account (1867-68).
152. Hypothec (Scotland)—Return.
156. County Expenditure—Return.

Delivered on 24th April, 1869.

85. Bill—Municipal Franchise.
90. ,, Local Government Supplemental.
91. ,, Merchant Shipping (Colonial), 1869.
153. Post-office Savings Banks—Return.
158. Vagrancy (Cumberland and Westmoreland)—Correspondence.
Public Petitions—Fifteenth Report.

Delivered on 26th April, 1869.

92. Bill—Colonial Prisoners' Removal.
93. ,, Copyright (Periodicals).
94. ,, Railway Construction Facilities Act (1864) Amendment.
64. (v.) Committee of Selection—Sixth Report.
102. (11) Maynooth College—Supplementary Return.
123. Wine Duties—Correspondence.
46. Stannaries—Return.

Patents.

From Commissioners of Patents' Journal, April 23.

GRANTS OF PROVISIONAL PROTECTION.

Aërial navigation, apparatus for—1124—C. D. Abel.
Belt buckles—979—W. E. Gedge.
Boots, &c., apparatus for cleaning—1005—G. H. Ellis.
Boots, &c., fastenings for—1082—R. J. Colls and A. E. Bull.
Boring apparatus—1035—F. F. Villepigue.
Boxes, self-closing—407—G. Gros.
Chimney cowls—1130—C. Turner.
Cisterns, &c., apparatus for drawing and preventing waste of water from—1142—J. Chandler.
Cog-cutting, &c., machines—1080—J. Denis.
Compasses, &c.—1168—A. M. Clark.
Crinolines, &c.—1047—E. Collard.
Crucibles, &c, apparatus for manufacturing—1098—J. Hynam.
Door bolts and staples—869—M. Tildesley.
Felted fabrics—1122—A. d'Azambuja.
Fire-arms, apparatus for cleaning—1063—C. E. H. C. Healey.
Flax, &c., cleaning—1094—E. Brasier and J. E. Hodgkin.
Flour, manufacturing—1112—D. Johnson.
Fountain pens—1114—A. M. Clark.
Game, suitable for outdoor or indoor exercise—1053—B. McEvoy.
Gas meters—1102—D. B. Peebles.
Harmoniums, &c.—3765—W. Dawes and E. A. Ramsden.
Hydraulic machinery—971—H. Davey.
Hydrocarbons, apparatus for burning liquid—1152—J. H. Johnson.
Hydrocarbons, apparatus for burning liquid—1158—C. E. Brooman.
Ice-making machines—669—F. Windhausen.
Looms—955—J. Briggs and J. Almond.
Meat, &c, storing and preserving on board ship—935—E. H. Huch.
Nutcrackers, &c.—1154—T. White.
Organs—1064—J. W. Warman.
Pictures, &c., hanging—1084—C. J. F. Campbell.
Pipes and tubes, jointing—1144—A. H. Renton.
Railroad rails, joints for—1134—W. E. Newton.
Railway carriages, &c., propelling—1118—S. F. Shore.
Railway switches, indicators connected with—1126—T. F. Cashin.
Railway trucks and carriages—1156—C. T. Swanston.
Railways—1120—W. R. Lake.
Reaping and mowing machines—1078—T. Culpin.
Resinous bitumen—3893—W. E. Gedge.
Rotary engines, pumps, and meters—1088—A. V. Newton.
School desks, &c.—1170—W. J. Cowlman and A. Doe.
Sewing machines—1096—H. A. Bonneville.
Skins, removing hair from—1106—J. H. Johnson.
Slide valves—1128—W. Brock.
Steam engines—1140—J. Leechman.
Steam engines—1150—B. W. Farey.
Steam engines, &c.—1166—F. J. Bramwell.
Straw, braid, &c., stitch for sewing together—1108—E. T. Hughes.
Sunshades for hats, &c.—891—W. Harrison.
Telegraph wire, manufacturing—1136—J. H. Johnson.
Telegraphic cables, constructing and protecting—1076—J. Aspinall.
Valves—1110—L. J. Crossley and R. Hanson.
Vehicles, constructing and propelling—1086—W. W. & J. D. Hooper.
Vehicles, indicating the distance travelled by—1148—T. Akinson and R. Smith.
Velocipedes—949—H. G. Dixon.
Velocipedes—1092—H. W. Lobb.
Velocipedes—1146—G. Keighley.
Velocipedes—1162—W. H. Buck.
Water-closets—1164—R. Heyworth.
Wood, &c., preparing for combustion—947—C. Weekes.

INVENTIONS WITH COMPLETE SPECIFICATIONS FILED.

Hat rims, manufacturing—1194—H. A. Bonneville.
Hydrocarbon oils, manufacture of heavy—1178—G. T. Bousfield.
Sewing machines—1205—N. Wilson.
Steam engines, valves and valve gear for—1171—A. K. Rider.

PATENTS SEALED.

3044. G. Graveley.
3249. R. Ferguson and G. Lord.
3267. P. M. Crane.
3269. B. Nicoll.
3274. W. Boulton.
3276. T. Speight, sen., and W. H. France.
3277. T. Priestley & W. Deighton.
3279. F. Ransome.
3283. G. Zanni.
3289. J. Wallace.
3291. J. Johnson.
3312. J. and W. Adams.
3324. J. Brönner.
3539. C. D Abel.
37. A. W. C. Williams.
559. J. Breeden.

From Commissioners of Patents' Journal, April 27.

PATENTS SEALED.

3296. M. A. Soul.
3305. M. Benson.
3308. F. A. Blanchon.
3318. W. Collins, jun.
3328. B. Dickinson.
3334. J. Dannatt and T. S. Turnbull.
3339. J. A. R. Main.
3347. E. Holden.
3353. S. Ward, W. Hurst, and J. Tuer.
3372. J. Parrott and W. Jones.
3376. W. Baker.
3389. A. M. Clark.
3435. T. B. Collingwood and W. Hardman.
3436. P. J. Livsey.
3451. C. Markham & W. Knighton.
3453. C. Markham & W. Knighton
3573. H. E. Newton.
3575. E. R. Wethered.
3745. W. Baines.
3829. J. Worrall and J. Kershaw.
3830 T. Aveling.
173. C. Baunscheidt.
339. J. Howard.
604. W. A. Herring.
660. T. Greenwood.
752. T. Greenwood.

PATENTS ON WHICH THE STAMP DUTY OF £50 HAS BEEN PAID.

1106. D. Evans.
1116. J. Leigh.
1159. D. Bievez.
1170. T. Kirby.
1134. J. H. Wilson.
1162. A. Upward and A. A. Cochrane.
1136. G. E. Donisthorpe.
1278. W. Young and P. Brash.
1163. G. E. Noone.
1215. G. Davies.
158. A. A. L. P. Cochrane.
1196. T. A. Weston.
1305. C. Moseley.

PATENTS ON WHICH THE STAMP DUTY OF £100 HAS BEEN PAID.

1470. J. Stone.
1201. F. Dangerfield.
1199. J. F. Allen.
1214. J. Elder.
1221. W. Fisken.
1228. J. G. N. Alleyne.